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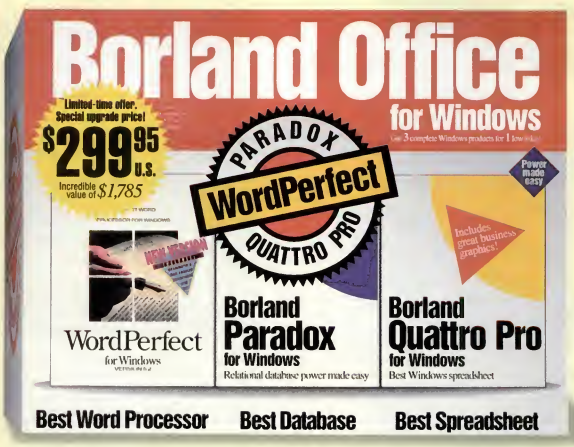

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WordPerfect for Windows 5.2
June, 1992

PC Magazine Editors' Choice
Paradox for Windows 1.0
May 11, 1993

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MAY 24, 1993 | THE VOICE OF PERSONAL COMPUTING IN THE ENTERPRISE | VOLUME 15, ISSUE 21

ENTERPRISE COMPUTING

The future of networking as we know it

Will Asynchronous Transfer Mode and legacy LANs coexist in 2013? See page 67

PRODUCT COMPARISON

TCP/IP, NFS for Unix file, print services

We look at eight TCP/IP products that give users access to a Unix host. See page 106

Novell readies enhancements to NetWare 4.0

BY TORSTEN BUSSE AND VANCE MCCARTHY

Novell Inc. is preparing improvements to NetWare 4.0 that will provide more flexible directory management and improved integration with existing NetWare 2.x and 3.x LANs.

Some of these enhancements should reach customers within six to eight months, company officials confirmed last week.

"By the time large enterprises with several hundred servers roll out 4.0, these pieces will be in place," said Bob Young, a vice president of Novell's NetWare products division.

These disclosures follow the release of a report by the Salt Lake City-based analyst firm The Burton Group that cautions customers to evaluate NetWare 4.0 carefully before deploying it in production environments. The improvements to 4.0 were not prompted by the Burton report, Novell said.

"We can't comfortably recommend that users rush out to-

See NETWARE, page 171

PC power leaps forward at Comdex

Increasing power of hardware, OSes will draw mission-critical applications

BY SHAWN WILLETT AND KELLEY DAMORE

Spring Comdex promises to be a crucial turning point for PC technology and PC managers.

Long-awaited technologies announced at the Comdex/Windows World shows will enable networked desktop PCs to take over applications that form the heart of corporate computing.

Transaction processing, mission-critical customer support, general ledger and accounting, and order-entry systems are making the trip down to the desktop, thanks to the new hardware and operating systems being announced.

Specifically enabling the shift are powerful 32- and 64-bit hardware such as Pentium, Alpha, and MIPS, which will converge with industrial-strength 32-bit operating systems such as Windows NT and OS/2 2.1.

Even though final shipment of some pieces might be months away, the new technologies will result in a rapid acceleration of downsizing mission-critical applications, users say.

Final proof lies in corporations using these technologies.

At the show, Pacific Gas & Electric Co. will present its plan to convert its customer information system to a distributed PC-based client/server system. The first production deliverables of the operation — which will eventually handle 1 million input transactions per day — have

See COMDEX, page 8

COMDEX Windows World

Coverage continues...

See pages 8, 12, 37, 40, 51, 58, 171, 174.

NT to bundle Intel, MIPS support

BY STUART J. JOHNSTON

At its Windows NT gala today in Atlanta, Microsoft Corp. is set to announce pricing, symmetrical multiprocessing options, and support for both Intel and MIPS chip sets in the same box.

Microsoft also said it will ship both desktop and server versions of the product by July 30. But sources briefed by the company say officials have cautioned its accounts that it could be late August before the server version of NT actually ships.

"We met with a very large number of customers [recently]

See NT, page 8

Apple takes both high and low roads with latest PowerBooks

Improves high-end color; adds lower entry-level model

BY TOM QUINLAN

Apple Computer Inc. is expanding the PowerBook line at both ends, with its eagerly anticipated active matrix color 185C and a low-cost replacement to the 145, said sources familiar with the product.

The products will be introduced on June 7, with Apple pricing the 185C at around $4,000.

"People are still a little used to paying a premium for an Apple system," said one dealer excited about the offering.

"For active matrix color and the fact that it's an Apple, the price is probably in the ball-park," the dealer added.

The low-end notebook will be priced at about $1,500, the sources said.

Unlike Apple's first attempt at color — the PowerBook 165C with a 640-by-480 passive matrix screen — the 185C will sport a full 640-by-480 VGA screen that "will be competitive with any active matrix screen on the market," said one observer.

"There wasn't anything special about the 165C's screen, but this one delivers the quality users expect from Apple," the observer said.

The configuration of the 185C will be the same as the 180

See APPLE, page 171

Intel goes into OverDrive solving upgrade problems

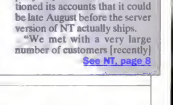
BY TOM QUINLAN AND SHAWN WILLETT

A number of faulty system designs incorporating Pentium upgrade sockets have prompted Intel Corp. to start redesigning the upgrade chip, but a handful of manufacturers have already solved the heat problems associated with the P24T processor.

Users will have a better chance of safely upgrading their 486-based systems with a Pentium OverDrive processor if the system includes:

- a second fan, or room to install a second fan next to the upgrade processor;
- a heat sink that directs heat away from the motherboard;
- plenty of space around the chip to facilitate air flow.

Manufacturers such as Acer



America Inc., Advanced Logic Research Inc., Compaq Computer Corp., NEC Technologies Inc., Digital Equipment Corp., Gateway 2000, and Dell Computer Corp. already offer those features or plan to ship them with the upgrade chips.

PCubid Computer Technology of Sacramento, Calif., is also offering a $39.95 solution that

See OVERDRIVE, page 171

NEWS

Lotus revamps SmartSuite with enhanced work sharing

BY DOUG BARNEY

After more than a year without a comprehensive upgrade, Lotus Development Corp.'s SmartSuite application bundle will get a face-lift this summer. Most enhancements are designed to improve its work sharing facilities, Lotus insiders said.

SmartSuite 2.0 will include new versions of four of its five applications and retain its $795 price tag. It will include cc:Mail for Windows 2.0, adding rules and an easier to use interface; 1-2-3, Release 4 for Windows; Freelance Graphics for Windows 2.01; and Ami Pro 3.01.

Organizer, which was part of a temporary bundle, has not been upgraded but is now a permanent member of the SmartSuite roster.

The spreadsheet, word processor, and graphics applications are all "Notes enabled" and use a Notes server to organize, share, and distribute files. However, Lotus' ultimate plans are to give users the ability to work on discrete areas of a document or presentation within the same file or to create special versions of documents or presentations.

"This is not full Notes integration, but it is an indication of what is going to be happening," a Lotus source said.

Jim Manzi, Lotus' chairman, said at the company's annual meeting last week that all major Lotus applications will be Notes enabled by late this year or early next year.

For some users, integration is more important than features.

Stacy Myers, senior program analyst for the South Florida Water Management District, in West Palm Beach, said she has run into formatting and line problems while trying to move files among most applications.

"Lotus, though, has done a excellent job of integrating its applications," Myers said.

For users like Myers, Lotus is preparing the Working Together Bonus Pak, an assortment of macros and modules that help applications share data, Lotus sources said. The add-in will be included in SmartSuite.

"It allows you to easily move between products, set up OLE [Microsoft's Object Linking and Embedding] links, or collect data from one product and use it in another," the Lotus source said.

The Ami Pro upgrade, which is considered an interim release, will work more closely with Lotus Organizer, a Windows personal information manager.

Lotus insiders hope the revamped product will improve its position against Microsoft Office, which strongly outsells SmartSuite and is a key reason that Lotus' spreadsheet share has remained relatively small, a Lotus insider said.

SmartSuite 2.0: What's in it?

- **1-2-3, Release 4 for Windows:** Improved data access, versioning, full Notes support.
- **Ami Pro 3.01:** Electronic mail merge, file sharing via Notes.
- **Freelance Graphics for Windows 2.01:** Presentation sharing and distribution via Notes.
- **cc:Mail for Windows 2.0:** Rules technology similar to BeyondMail's for managing messages.
- **Working Together Bonus Pak:** Allows applications to use tools from other apps.

Interface links PCs to office equipment

BY STUART J. JOHNSTON

Microsoft Corp. and major office equipment vendors will announce next month an interface standard intended to let users easily communicate with common office machines from their PCs.

Although the programming standard to be announced June 9 in New York is not earthshaking — many office machines can be linked with PCs already — it will provide a standard based on Windows.

Such an interface standard will let developers write applications that work with whatever office machine is available, no matter who the manufacturer is.

For users, it will simplify using complex equipment such as collating copiers and fax machines.

"Some of the new generation of copiers take a Ph.D. to operate," said Jesse Berst, publisher of the *Windows Watcher* newsletter, in Redmond, Wash. "This will let you send something off to the copier from your desktop to have it printed, collated, and stapled so that you can pick up your copies later."

The proposed standard will make printing multiple copies of documents in a double-sided format, with holes drilled for binding, as simple as using a PC printer today, Berst added.

Microsoft has frequently talked about turning PCs into "information appliances" that integrate telephones, voice, video, and electronic mail systems as well as fax machines and copiers.

Earlier this month, the company announced a telephony interface that will let PCs link with telephone systems. (See "Scores of vendors answer call of telephony API," May 10, page 6.)

Last year, Microsoft also introduced a programming standard for writing telecommunications applications that run on Windows, the Messaging Applications Program Interface. That standard is supposed to be completed next year with the release of Windows 4.0.

All of the emerging programming interface standards will be part of Microsoft's Windows Open Services Architecture, or WOSA.

Most of the major office equipment manufacturers are expected to participate in the announcement and eventually release products that conform to the specification, including Sharp Electronics Corp., Panasonic Communications and Systems Co., Hewlett-Packard Co., Canon Computer Systems Inc., Eastman Kodak Co., and Xerox Corp.

Microsoft would not comment on the announcement.

AT DEADLINE

Compaq's direct channel may sell high-end lines

Compaq Computer Corp.'s telemarketing operators are promising callers that the direct response sales channel will soon begin selling high-end laptops, desktop systems, and servers.

A Compaq press liaison refused to confirm or deny those claims but said it would not come as a surprise. Only systems in plentiful supply would be considered for direct sales, he said. Compaq, which refers to itself as the market leader, followed Dell Computer Corp., IBM, and Apple Computer Inc. into direct sales about two months ago. (See "Compaq makes initial foray into crowded direct market," March 15, page 3.)

At that time, Compaq said it would not sell its more powerful and pricey DeskPro/M, LTE Lite notebooks or servers via phone, limiting phone customers to about a dozen low-end products. Observers said the company kept more powerful products out of the direct channel to appease dealers who would take offense when customers switched sales channels.

The telemarketing representatives said that because of customer demand, DeskPro/Ms, LTEs, and possibly ProSignia servers will be available within a month.

— Steve Polilli

CorelDraw 4 ships with special pricing

Corel Corp. shipped CorelDraw 4 last week, offering Windows users a new animation module in addition to drawing, charting, image editing, and presentation capabilities. (See "Contented Corel users get animation module," May 17, page 13.) Current CorelDraw users can upgrade to the $595 graphics package for $199 until June 25. After that the upgrade will cost $249. Corel also said it expects to ship CorelDraw 4 to Macintosh users in November when Apple Computer Inc. ships QuickDraw GX. Ottawa-based Corel also dropped the price of CorelDraw 2.5 for OS/2 to $199 and expects to ship CorelDraw for Windows NT next year.

— Jeanette Borzo

ValuePoints to get CD-ROM and audio

IBM Corp. is adding Ultimedia capabilities to its low-end ValuePoint series this week at spring Comdex. Systems will range from 25-MHz 486SX-based models designed for the home user to a 486DX2/66-based PC targeted at corporate users. Three standard configurations will be available through IBM dealers, with prices starting at $2,099. All of the systems include a double-speed CD-ROM player, a 16-bit audio card from Creative Labs Inc., and a variety of multimedia software titles.

Users who order directly from IBM will be able to customize the system with their choice of software, hard drive, memory, and processor. IBM officials guaranteed that the ValuePoints would be capable of running Windows 3.1 software but declined to specify whether the systems would be preconfigured with OS/2 or DOS and Windows.

— Cate Corcoran and Tom Quinlan

NFS, TCP/IP for NT due in August

Beame & Whiteside Software Ltd. of Ontario is among the parade of third-party vendors at spring Comdex in Atlanta that are unveiling or previewing products to run on Microsoft Corp.'s Windows NT. Beame & Whiteside's BW-Services product will deliver Sun Microsystems Inc.'s Network File System and TCP/IP client and server utilities on Windows NT this August.

The TCP/IP electronic mail client for NT will let PC users migrating to NT use the TCP/IP transport built into NT by adding BW-Services utilities. One component of BW-Services, BWMail, offers support for Simple Mail Transport Protocol. Another will include a Unix-like server service called INet Daemon that runs continuously in the background, launching network services as requested by remote clients.

Also included will be TelNet Daemon, which will let remote users log on to a local machine, and File Transfer Protocol Daemon, which allows remote users to transfer files to and from an NT workstation and other utilities.

— Cheryl Gerber

Distributed Thinking / Stewart Alsop

Brace yourself for the next generation of desktop operating systems

Are we ready to adopt a new generation of desktop operating systems? This is an interesting question to ask, given that today Bill Gates will "officially" introduce Microsoft NT (a really big secret) in his keynote at Windows World in Atlanta; a few hours later, IBM's Jim Cannavino will offer the first public demonstration of OS/2 2.1 in his keynote speech for the spring Comdex show.

As you know, the hot operating system issues for DOS and Macintosh OS users are disk compression and memory management. While those systems are markedly different in character and history, the truth is that users of both end up facing the same basic issues — the systems were not designed to be very flexible or expandable. As we get more powerful machines with more complicated applications software, these operating systems begin to feel less and less coherent.

I certainly feel that way, at least. Recently, on my PC, I tried playing a new CD-ROM-based game called 7th Guest, and the very first thing I had to do was to figure out how to "load DOS high" to free up more than 550K of "conventional" memory (which is neither expanded nor extended). And, on my Macintosh, a key communications program (AppleTalk Remote Access) began quitting unexpectedly on me. (For PC users' information, "Application Has Quit Unexpectedly" is the Macintosh equivalent of the infamous UAE — Unrecoverable Application Error — dialog box in Windows 3.0.) I had to back up and reformat my hard disk and reinstall the entire system to solve the problem, after spending significant time playing with my Inits (the equivalent of TSRs in PC parlance) to see if they were creating conflicts with the program.

I find myself spending more and more time worrying about whether the computer is happy and less and less time getting my work done. I'm beginning to wonder whether that is acceptable to me as a user, particularly an experienced one, in 1993. On the Macintosh, I don't have a choice since I will have to wait for Apple to create and deliver new versions of the Macintosh operating system that deal with this problem. (Last week, we reported that Apple is indeed working on a new microkernel-based system referred to as NewOS, but we will have to wait until late next year to get it.)

But I do have a choice on my PC — with IBM's release of OS/2 2.1.

One of my real hesitations (as an individual user) about OS/2 2.0 was that it came out with Windows 3.0 support just six months before Windows 3.1 became the target for development. That's not IBM's "fault," but it still is a key issue for the user.

> **I spend more and more time worrying about whether my computer is happy.**

Now it appears that the Windows 3.1 applications programming interfaces (APIs) have stabilized, and we will have them for some time to come. Both IBM and Sun Microsystems Inc. are publicly committed (in different ways) to supporting Windows 3.1 APIs regardless of how Microsoft changes Windows. Sun has introduced something called Wabi. (It used to be WABI, which stood for Windows Application Binary Interface, but Sun decided it didn't want to take on the trademark issue, so now it's just Wabi.) Wabi runs on top of Solaris and allows Windows 3.1 applications to run without Windows itself.

IBM, whose free access to future versions of Windows expires later this year, has made a commitment to do the same thing with OS/2 (probably on its new, microkernel version of OS/2 called Workplace OS, due this fall) although it has not said it will license or support Sun's Wabi.

Anyway, from a user's point of view, I am beginning to feel like I might be protected from instant obsolescence the next time Microsoft revises Windows. And that makes switching to another system much more palatable. Now the choice is: Buy OS/2 2.1 now. Buy Solaris 2.0 for Intel with Wabi soon. Or wait for Microsoft NT in the near future. Any one of these three options will give me an operating system that will be much better at taking care of itself, along with the range of Windows 3.1 applications.

As I said, are we ready to adopt a new generation of desktop operating systems?

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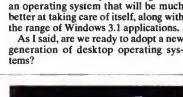

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Borland eases migration for dBase, Paradox users

BY SCOTT MACE

SAN DIEGO — dBase III and IV users are convinced that their DOS applications will run unchanged under Borland International Inc.'s dBase for Windows.

Last week's closed-door demonstrations of the Windows beta product at Borland's annual user conference here sent a clear message to customers that application migration is a top priority. And Paradox users will get a utility to convert Paradox for DOS and ObjectVision forms to Paradox for Windows forms.

dBase for Windows' newly acquired upward compatibility was born late last year when Borland pulled back the initial beta because of customer complaints.

Now users can continue to develop applications in dBase IV for DOS instead of waiting for the Windows product, due out this year.

"This will give users a chance to move into the Windows environment painlessly with applications they're already using," said Rachel E. Holmen, an Oakland, Calif.-based consultant and member of Borland's volunteer CompuServe technical support staff.

dBase for Windows will still include an object model, but users will not have to learn it to get applications to work, Borland officials said.

Paradox users applauded the announcement of Paradox for Windows Object Converters. The first such converter, scheduled for release in the third quarter, will convert Paradox for DOS 3.0, 3.5, and 4.0 and ObjectVision 1.0 and 2.0 forms to Paradox for Windows forms. It will be available, possibly for free, through Borland technical support and on CompuServe, GEnie, and BIX, Borland officials said. Report and query converters will follow.

"If I've got a high investment in my forms and reports, this is going to be a nice way to quickly get up and running [in Paradox for Windows]," said Martin Rudy, vice president of Fara/Matrix Solutions Inc., a Seattle consulting firm.

Converting Paradox for DOS applications to Windows is never going to be as easy as the same process in dBase due to Borland's decision to discard the DOS-based Paradox Application Language (PAL) in favor of its new Object PAL scripting language for Windows.

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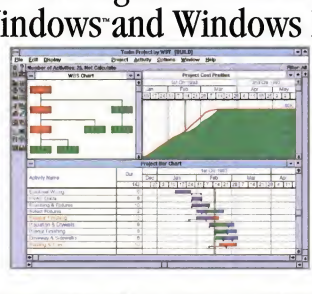

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Corrections

The term "mixed reviews" was used inappropriately in the opening paragraph of "1-2-3, Release 4 is luring some, but not all, users to Lotus" (May 17, page 13). As the story reported, user reaction overall to the new release was decidedly positive.

In the May 3 Pipeline item "IBM reduces prices on network adapters" (see page 40), the phone number listed is incorrect. IBM can be reached at (800) 426-2255.

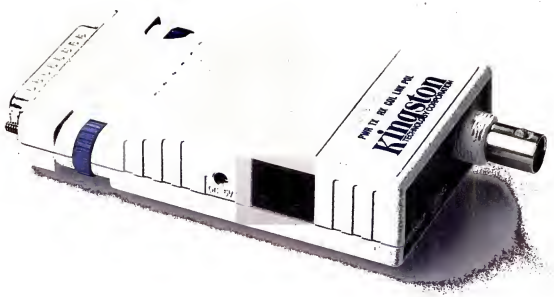
The chart accompanying the First Look "PCMCIA technology gives portables LAN throughput" (May 17, page 1) contains an error. The footnote incorrectly states that IBM's Token Ring 16/4 CCA card cannot run on NetWare 3.11. In fact, the card was not tested running NetWare 3.11.

Due to a combination of editing and company errors, "Sound card lets users talk to Windows apps" (May 17, page 26) contained several errors. The phone number for Creative Labs should have been (408) 428-6600. The company's $349 card is called the Sound Blaster 16 with Advanced Signal Processing. The Sound Blaster 16 lists for $249 and includes software-only voice compression. The voice-recognition software can have as many as 1,024 commands active at once.

The phone number in the Product Spotlight "Card-size modems sport an unobtrusive jack" (May 17, page 40) is incorrect. Megahertz Corp. can be reached at (801) 272-6000.

The pricing information in the article "Help desk merger breeds Utopia" (May 17, page 43) is incorrect. The Advanced Help Desk Tracking module is $995. The Training Module is $395. The Help Desk Series is not $995.

InfoWorld apologizes for these errors.



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COMDEX & Windows World NEWS

Product Spotlight

Designer 4 gets easier interface

Micrografx Inc. plans to give Designer users an interface that is as easy to use as the one in its Windows Draw product when it releases Designer 4.0 next month. The product will be shown at Comdex this week. The Windows-based graphics software's interface sports an interactive tool ribbon, context-sensitive pop-up menus, and a hint line. Designer 4.0's added desktop publishing features offer better text handling, kerning controls, automatic drop caps, and more than 280 Type 1 fonts and 280 matching TrueType fonts.

NT / from page 1

NT to bundle Intel, MIPS support

and they said, 'We don't care if it ships tomorrow or 120 days from now,' " said Dwayne Walker, director of marketing for NT and networking products. "They just want a quality product."

Microsoft has always maintained that Intel and MIPS versions would ship simultaneously, but it has now decided to ship executable code for both chip architectures in one package.

NT will also have transports for NetWare SPX/IPX protocols, but users will still need to get the NetWare requester from Novell Inc.

Another surprise comes in how symmetrical multiprocessing — a buzzword for machines that run more than one main microprocessor — will be provided.

The desktop, or client, version of NT will support either one or two main processors in a single machine, while the Windows NT Advanced Server will support up to four processors.

For machines that have more than four processors, such as those offered by NCR Corp. and Sequent Corp., customers will purchase the operating system directly from the hardware manufacturer.

Prices for NT will be

- $495 for the desktop version;
- $295 for upgrades from Windows for DOS, Windows for Workgroups, and OS/2 to the desktop version;
- $2,995 for the Advanced Server; and
- $595 for upgrades from LAN Manager to the Advanced Server.

In concert with NT's rollout, several companies, including Hewlett-Packard Co. and NCR, will announce major support for NT corporate customers.

Both NCR and HP plan to offer a variety of professional services worldwide, ranging from system maintenance and 24-hour troubleshooting to integration and applications design, representatives of those companies said.

Also, Microsoft officials say they have trained more than 8,000 people in the distribution channel to be specialists on NT.

IBM touts OS/2's strength as platform for client/server

OOP architecture eases multiplatform development

BY ED SCANNELL

NEW YORK — To increase the appeal of OS/2, IBM is making a concerted effort to establish OS/2 2.1 as a client/server operating system.

Although the latest OS/2, formally rolled out here last week, is bolstered by enhanced desktop support for Windows and

One on One with IBM's Lee Reiswig .....See page 174

PC peripherals, it is on the OS/2 server end that users will see the most dramatic improvements.

The public will get its first close look at OS/2 2.1 at Comdex this week, where IBM will demonstrate how an OS/2 server — and its communication, database, and LAN server add-on modules — will enable cooperative processing applications. These are specifically aimed at making OS/2 servers the link between desktops and host systems, such as minicomputers and mainframes.

"With OS/2 you can take your application at the client and run it against a relational database at the server or against the host, simultaneously," said Art Olbert, director of IBM's LAN Systems Group, in Austin, Texas. The current version of OS/2 will let users upgrade only the server or the host, but a version due later this year will allow simultaneous upgrades, he added.

IBM will also demonstrate directory service and single log-on features for OS/2, like those offered by Novell NetWare, Banyan Vines, MVS, and AS/400.

Although not slated for a Comdex debut, IBM also said OS/2 will support symmetrical multiprocessing this year. Previously, IBM wasn't scheduled to introduce this feature until next year's roll out of the Workplace OS version.

"We have some early work going on with customers right now," said Lee Reiswig, president of IBM's personal software products group. "It is not so much a response to [Windows] NT as it is one to providing better performance."

Reiswig also said IBM would bundle cross-platform development capabilities into OS/2 by year end. The object-based OS/2 technologies — Systems Object Model (SOM), Version 2 and its Distributed SOM — would enable developers to reuse code and more easily port software to run on both Intel and RISC hardware. IBM's 32-bit, C Set++ for OS/2 will be sold separately as an add-on tool for building mission-critical applications.

— Vance McCarthy contributed to this story.

COMDEX Windows World

What started as Computer Dealers Expo 13 years ago has blossomed into two shows that now attract thousands of corporate users. Here's what to expect:

- 5,000 products, 700 of them new
- 1,000 exhibitors; 75,000 attendees
- 4 keynote speeches by industry celebs
- LANLab and Unix/Open systems showcases
- 70 conference sessions, to cover issues including corporate computing and connectivity.

IBM shows renewed resolve with 2.1

IBM last week introduced a spruced-up OS/2 2.1 and vowed to be more aggressive salespeople.

For the rollout, IBM has fixed OS/2 2.0's shortcomings. Among the new client features:

- Windows 3.1 support with the capability to run most 386 Enhanced Mode applications;
- implementation of the 32-bit graphics engine;
- support for CD-ROM drives and some 260 printers;
- multimedia support;
- PCMCIA support;
- seamless 32-bit display drivers for Super VGA, XGA, XGA-2, and VGA; and
- Advanced Power Management for laptops.

IBM's personal software products (PSP) division has also put in place a dedicated OS/2 sales force and has sweetened contracts with resellers.

"In the past, [selling OS/2] was a part-time occupation for our sales force," said Lee Reiswig, president of PSP. "Now we'll have a dedicated force who lives and breathes on OS/2's success."

OS/2 received another needed boost when, as expected, PC maker AST Research Inc. said it will deliver OS/2 2.1 as an option on many of its systems. (See "IBM officially takes wraps off OS/2 2.1," May 17, page 1.)

Users like the cleaned-up OS/2 and more aggressive IBM. "They have done a good job with [OS/2] 2.1, but they are going to have to market the hell out of it," said a corporate IS manager.

Version 2.1 will ship in volume June 14 for $249. For the first 90 days, IBM will offer a $99 upgrade on CD-ROM and $119 on disk.

— Ed Scannell

COMDEX / from page 1

PC power leaps forward at Comdex

just come on-line.

"With Windows NT, we see an operating system with a much more solid foundation," said Al Simila, manager of the project at PG&E. Multitasking and good graphical interfaces make NT appropriate for mission-critical operations, he said.

PG&E is still deciding whether to use NT as the main servers on the system, replacing the current Sun/Oracle combination.

Other corporate downsizing projects using the new technologies include:

- Baxter Healthcare Corp., in Deerfield, Ill., will begin testing next week a warehouse management system based on NT. By September the system, which will eventually encompass 60 warehouses, will be on-line.
- El Paso Natural Gas Co., in El Paso, Texas, has completed downsizing from a mainframe to NT for imaging and for a reporting application from desktop word processing and spreadsheet applications. The company is also working on developing transaction-processing applications on the system.
- Intel Corp. has been downsizing all manufacturing from a mainframe to OS/2 SQL servers running on 486 and eventually Pentium platforms. NT SQL Server, when it is available, will also be part of the system.

— Jim Hammett and Vance McCarthy contributed to this article.

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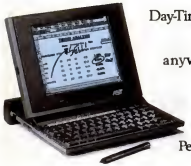

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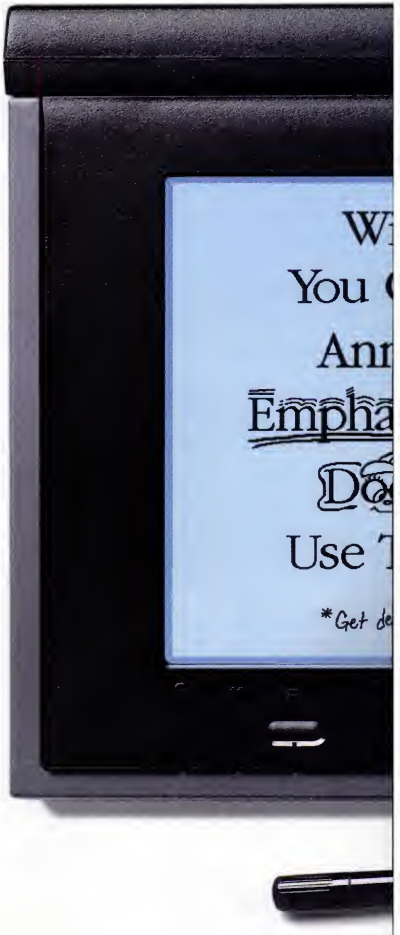

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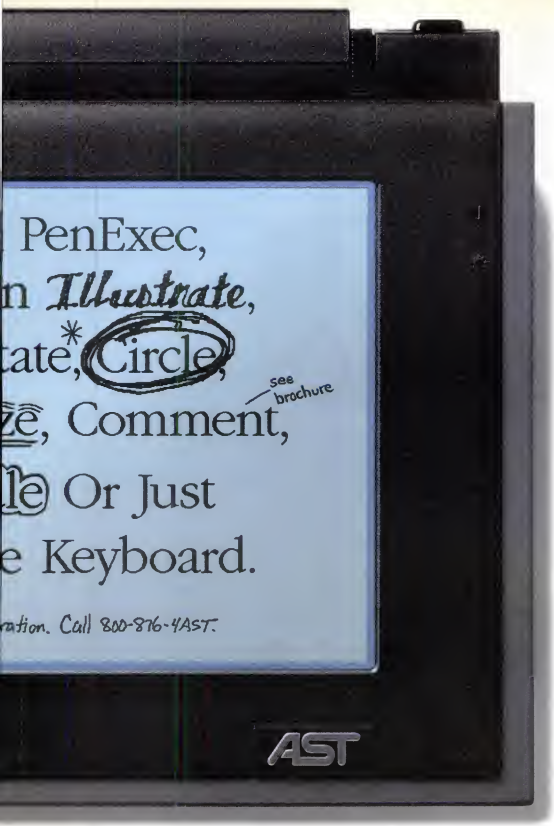

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Impresario hosts information management system

By Jim Hammett

Users attending spring Comdex in Atlanta will get a peek today at a powerful LAN-based information management system that will allow them to attach sound and video messages to image and text displays.

Targeted at large corporate offices such as banks, insurance and finance companies, and public utilities, Impresario NT, from Columbia, Md.-based Ideas Inc., will be available in the fall. It pushes what some observers believe the new technology will create — a paperless office.

Impresario NT uses Microsoft Corp.'s Windows NT as the operating environment for 32-bit NT server applications and services, according to Jim Myers, president of Ideas' commercial systems division. It also uses Microsoft's SQL Server for Windows NT as its database management component, Microsoft Windows and DOS 6.0 for the workstation operating environment, and Microsoft Mail for sending and receiving mail.

"[Impresario NT] is rooted in document and image management packages," Myers said. "We give users some basic tools, such as full text search and retrieval, a workflow builder, forms processing, and a set of audit and alert tools."

Users will even be able to apply digital signatures to documents, Myers said.

Myers envisions the potential market as corporate offices that must organize and categorize a wide variety of paper or image documents.

"This system provides the user with an integrated set of image processing tools including scan, OCR, index, search, mail, fax, and print," Myers said.

Sound and video annotations can also be attached in instances where a quick reply or visual proof is necessary to a document or series of documents, he said.

The package will be marketed by GTE Vantage Solutions, Ideas' technology partner, and pricing will be based on a number of factors, including hardware and user configurations, Myers said.

Impresario NT will be shown in the Microsoft NT area of Comdex.

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Native Multi-Dimensional Arrays	YES	NO	NO
Pass/Return Whole Arrays	YES	NO	NO
Variables Available in Debugger	YES	NO	NO
Customizable Runtime Error Handling	YES	NO	NO
Reads and Writes Any .DBF Files	YES	YES	NO
Reads and Writes .DBT, .NTX Files	YES	NO	YES
Reads and Writes Paradox, .DB, .PX2 Files	YES	NO	NO

Comparison based on FoxPro Version 2.5 for DOS and dBASE IV Version 1.5

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DOS users can run Norton Backup for Windows update

By Jim Hammett

Workgroup environments with a mix of DOS and Windows machines are the place for The Norton Backup 2.2 for Windows from Symantec Corp.

As a superset of the backup feature in DOS 6.0, the just-released Norton Backup for Windows gives users the ability to read and restore files between DOS 6.0 backup sets and vice versa.

Users can run the Windows version regardless of the heterogeneous mix of backup solutions, according to Ken Felderstein, Symantec's security business director of the Peter Norton Group.

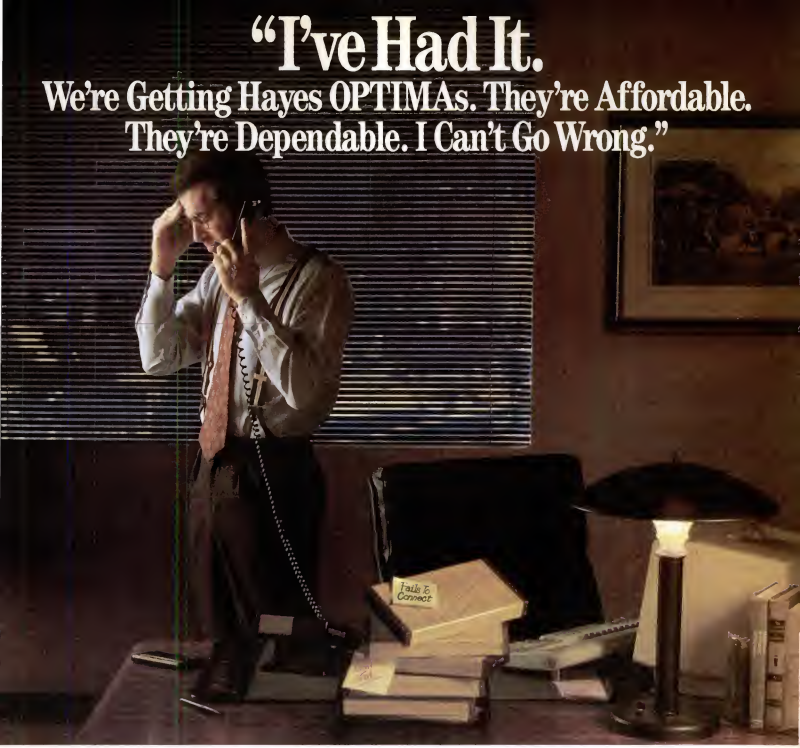
For instance, users can take advantage of preconfigured backup routines for popular applications, such as Lotus Development Corp.'s 1-2-3, Microsoft Corp.'s Word and Excel, or WordPerfect Corp.'s WordPerfect word processing package.

Faster backup execution is possible because the package includes support of high-speed tape controllers from Colorado Memory Systems and Iomega to supplement Norton Backup's tape drive support, Felderstein said. Users can back up multiple drives in a single session or create custom menus for these selections.

Norton Backup for Windows 2.2 is available for $149. Upgrades of either the DOS or Windows version are available to registered users for $19.

When users purchase DOS 6.0, they can also purchase The Norton Backup for Windows 2.2 for $69 at most major software retail stores, the company said.

Symantec, in Cupertino, Calif., can be reached at (408) 253-9600.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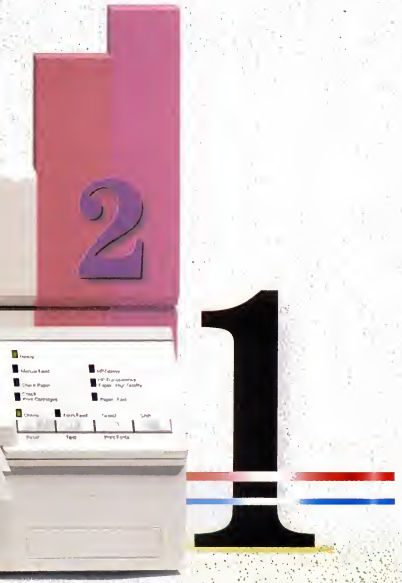

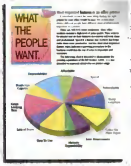

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PIPELINE

SHIPPING

Raindrop offers workgroup calendar

Raindrop Software Corp.'s Epoch 1.0 is an Object Linking and Embedding-based personal and workgroup calendaring program. It lets users associate documents with scheduled activities so the user doesn't need to run an application and then open a separate file. Epoch is available for $129 for a single-user version. (214) 234-2611.

Users can now update files or make changes to existing Macintosh applications, documents, or system files with UpdateMaker 2 from **ADinstruments**. The product retails for $220. (415) 964-2878.

UPGRADES

MacProject Pro 1.5 shares Project files

MacProject Pro 1.5, a project management package from Claris Corp., lets users share data and import and export files from Microsoft Project 3.0 for Windows and Mac. It is available for $599. Users of Version 1.0 can upgrade for $29. Users who purchased Version 1.0 after April 1 receive a free upgrade. (408) 987-7000.

ANNOUNCED

MapInfo, Claritas in development project

MapInfo Corp. and Claritas/NPDC Inc. entered into a development partnership to provide software products for data visualization and market analysis. MapInfo will design and develop the mapping component of Claritas' Catalyst, which will allow users to display and analyze proprietary data geographically for trends and relationships. MapInfo is at (518) 274-6000.

JetForm Corp. announced DOS versions of its JetForm Filler and JetForm for E-Mail 3.1 that give users identical data formats and electronic mail interfaces. The products are already available on Windows and provide users with circulation list capabilities, forms tracking, and a return-to-sender feature. (800) 267-9976.

With ClickBook from **BookMaker Corp.**, users can turn any Windows document into a double-sided booklet. Typical uses include creating a company phone directory from a database and creating booklets and manuals from word processors. The $69.95 printing utility will be out in July. (415) 617-1101.

ObjectView to get group application control

BY SCOTT MACE

ObjectView, a client/server tool for Windows recently acquired by KnowledgeWare Inc., will soon gain the capability to coordinate groups of developers sharing pieces of applications. A new report writer is also being added.

ObjectView 3.0, which will enter beta testing early in the third quarter and ship early in the fourth quarter, uses the power of SQL databases to store application pieces in an object repository, said Marc Pinotti, ObjectView solution manager at KnowledgeWare.

KnowledgeWare acquired the product from Matesys Corp.

The repository feature, usually found only in high-end CASE products, gives developers concurrent access to objects, such as windows or scripts, or check out objects for exclusive use.

Application team leaders can grant and revoke access rights to application objects no matter what file format they are stored in, and team members can share and reuse those objects across different applications.

The new release will build upon the recently shipped ObjectView 2.0, which features an object-oriented data dictionary that lets developers store most objects in most SQL database tables. (See "GUI development tools updated," July 20, 1992, page 16.)

ObjectView 3.0 will be capable of storing multiple versions of entire applications as well as multiple versions of pieces of each application, Pinotti said.

By using a SQL database to store these, development teams will leverage the concurrency control, security, and authentication of that database, he added.

The growing popularity of other object-oriented tools, such as Powersoft Corp.'s PowerBuilder, has not escaped KnowledgeWare's attention.

"A lot of object-oriented development languages implement inheritance such that you end up with exponential code growth," Pinotti said. "Our competition can only inherit windows, so if you don't want the associated code, you just hide it, but you still have it there."

Through early binding, ObjectView 3.0 objects inherit only the code needed, resulting in smaller, faster applications, Pinotti said.

Also being added to Version 3.0 is an object browser, which allows forward and reverse browsing of object classes to determine, for instance, all occurrences of a button in multiple forms.

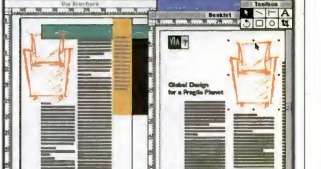
A new script manager will show all methods associated with an application. Scripts can be sorted by name, last date saved, or other parameters.

Also in Version 3.0 will be Personal SQL, an ad hoc query and report writer, which will also be sold separately for $199.

Designed to compete with Gupta Technologies Inc.'s end-user-based Quest product, Personal SQL will feature drag-and-drop query creation and allow embedded run-time queries in reports depending upon data conditions.

ObjectView 3.0 will sell for $3,999.

KnowledgeWare, in Atlanta, is at (404) 231-8575.



PageMaker 5.0 lets users open more than one publication at a time and offers more typographic precision.

Beta testers laud PageMaker 5.0

BY JEANETTE BORZO

PageMaker 5.0 will offer Windows and Macintosh users greater typographic control, more printing features, and easier ways to rearrange pages and move text and graphics between pages.

Beta testers on both platforms expressed great satisfaction with the new version of Aldus Corp.'s flagship desktop publishing program, although they said they wish it would be available sooner.

PageMaker 5.0 for Windows is due to ship sometime in June, with the Mac product following 30 days later. Aldus shipped PageMaker 4.0 to Windows users in February 1991 and 4.2 for Mac users in December of that year.

"It's been hard to resist the urge to use a competing product [while waiting for PageMaker 5.0], but this version is well worth the wait," said beta tester Rich George, a research physician at a Colorado-based pharmaceutical company.

"The control palette allows you to have tremendous control over kerning and tracking," George said. "It gives you much better typographic control."

"I know people are going to do back flips about [5.0's] incremental text rotation," said beta tester Doug Lidster, network administrator at Woodsmith Corp., in Des Moines, Iowa. "Now we have mathematical precision. Version 5.0 has really refined PageMaker's text capabilities with custom tracking tables and custom kerning," Lidster said.

PageMaker 5.0 also lets managers save complex printing options as a print style. "When the average LAN user wants to send off a file, they can click on Style 2 knowing that all of the right specifications were selected," Lidster said.

Users also can execute a single print command to produce nonsequential pages.

"It speeds up your work and makes you more efficient," said Jim Plowden, beta tester and operations manager at Expressive Images Ltd., in Los Angeles.

The option to open multiple documents has also pleased users. "The main benefit is to be able to drag and drop items from one document to another," Plowden said. "It's much faster and more intuitive."

"Another thing I like [about 5.0] is being able to sort pages without having to move elements off a page," said beta tester Alfred Green, communications coordinator at New York State Electric and Gas Corp., in Binghamton, N.Y. "I can lay out all the pages on the monitor and move them by clicking and dragging pages to a new location," Green said.

Beta testers' remaining wish-list items for future versions include an improved tables editor, a font preview for approving font changes before applying them, and an easy way to do stroked text (a character of one color with an edge of a different color).

Current PageMaker users can upgrade to the $895 program for $150. Macintosh-based users of Version 4.2 can upgrade to 5.0 for $75. Registered users who bought either Version 4.0 or 4.2 this year can upgrade to 5.0 for free.

Aldus, based in Seattle, can be reached at (800) 627-8880.

Product Spotlight

Presentation program unveiled

Last week Alpba Software Corp. introduced Bravo, a $79 Windows presentation program that offers many of the capabilities found in $500 programs such as Microsoft PowerPoint and SPC's Harvard Graphics.

The program features an outliner and a sorter, as well as 65 predefined graphs, 61 templates, and 10 drawing tools. Bravo supports Object Linking and Embedding. Its Smart DataPictures feature provides graphics with built-in intelligence, and clip-art objects automatically change as the user manipulates them. (617) 229-2924 .

8:00 Home *Over breakfast, you check your calendar on your PowerBook Duo. The day looks like it'll be a breeze. You'll put a few finishing touches on the Q2 forecast presentation that's due in a couple of days, return a few calls, and have a free afternoon (for a change).*

9:15 Your Office *You slide your PowerBook Duo into the Duo Dock and start working. Suddenly, your e-mail chimes. Your boss wants you on the noon shuttle to Boston, to present the Q2 forecast to his boss. Also, a client wants to see you ASAP. You hit the eject button and go.*

2:50 Borrowed Office *A colleague is at lunch, so you borrow his Duo Dock. You log onto e-mail back at the home office and learn your group has just won a new piece of business. You incorporate this news into your presentation (and change a few colors while you're at it).*

3:30 Conference Room *You clip on the Duo MiniDock and run the presentation from your PowerBook Duo. Everybody's impressed -- especially the guy who asks you a series of tough questions about a six-month-old project. You've got all your files, so you've got all the answers.*

No other computer could ge

For years, you've been trying to keep up with computers. Now there's a computer that can actually keep up with you: the Apple® PowerBook Duo™ System.

It's nothing less than the most flexible, adaptable and personal computer in the world.

On the road, it's a slim, sleek and powerful notebook computer.

Model	PowerBook Duo 210	PowerBook Duo 230
Weight	*4.2 pounds*	*4.2 pounds*
Memory	*4MB exp. to 24MB*	*4MB exp. to 24MB*
Storage	*80MB*	*80MB or 120MB*
Display	*9-inch backlit*	*9-inch backlit*
Battery	*Up to 4.5 hours*	*Up to 4.5 hours*
Speed	*25 MHz 68030*	*33 MHz 68030*

In the office, when plugged into a Duo Dock, it instantly becomes a fully expandable, no-compromise desktop computer that lets you work with a full-size keyboard and up to a 16-inch color monitor.

But what really sets the PowerBook Duo System apart from conventional docking systems is a bit of engineering genius called PowerLatch™ technology. A combination of elegant hardware and intelligent software that

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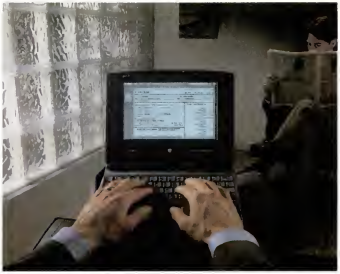

11:10 Your Client's Office *That $5 million project the client told you was off last week? It's on again. And due in two weeks. You type up a few job orders, which you'll fax from your PowerBook when you get to Boston. Now, however, you have to catch a cab for the airport.*

12:40 Noon Shuttle *All the files and software you use at your desktop are right here with you. You pull up the Q2 presentation and make the revisions to reflect the new assignment. Then you write a quick memo to your team, to make sure that everything's on schedule.*

7:00 Your Office *On the way home, you swing by the office to tie up a few loose ends. You see your boss. He heard the meeting went extremely well, and wants you to fly out and present to the people in London. Tomorrow. You send out a quick memo to update your staff.*

8:30 Living Room *Since you've got all your files and software right there with you, you could write a report, study the new research data or finish up those performance reviews. But hey, enough is enough. You settle back in your recliner and play a few rounds of Tetris.*

you through a day like this.

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There are no cables to fiddle with and no complicated "reconfiguring" procedures. Just slip the PowerBook Duo into the Duo Dock, and the system automatically recognizes all your networking resources and attached peripherals.

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To experience the PowerBook Duo System for yourself, call 800-732-3131, extension 100, for the name of the authorized Apple reseller located nearest you. (If you're in Canada, call 800-665-2775, extension 910.) And no matter how dramatically things may change in your life, at least you'll always have the one power you can depend on. The power to be your best.®

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Commence upgrade facilitates data sharing

Windows-based PIM lets users share views; automatically updates client databases

BY ED SCANNELL

Jensen-Jones Inc. will release June 1 an upgrade of its Windows-based personal information manager (PIM) that eases data sharing among users in workgroups.

Commence 2.0 has improved calendaring and contact management functions, and it lets users share databases and specific views of data across most popular networks.

Remote users who are not directly connected to the LAN can access the database with Sync Link, a database synchronization feature. Sync Link's compressed file export utility lets users synchronize separate databases, even when they reside on different client systems.

"With this version, Commence can join the world of distributed database applications," said Craig Jensen, president of Jensen-Jones.

The product's distributed database architecture especially benefits home and remote users by allowing them to disconnect from a LAN and retain a local copy of their databases. However, when users are connected to the LAN their data is automatically synchronized with all other shared copies.

Workgroup users can automate tasks, coordinate schedules, and share data and applications in ways that make sense to everyone in the workgroup.

Users can automate tasks and integrate them with other Windows applications using Commence's dialog-driven method of defining actions, Jensen said.

The program's improved calendar displays color-coded appointments by the month, week, or day. Users can automatically schedule events on recurring dates and drag and drop items to reschedule meetings.

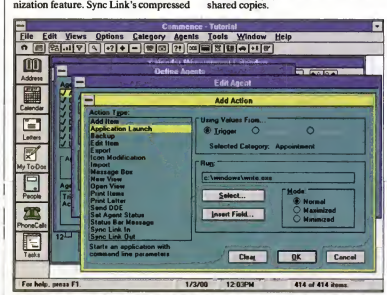
In Version 2.0 users can customize letter templates and automatically merge data stored in Commence to produce form letters.

The upgrade works with any IBM-compatible LAN that supports file sharing, including Novell Inc.'s NetWare, Microsoft Corp.'s Windows for Workgroups, and Artisoft Inc.'s LANtastic.

Commence 2.0 is priced at $395 for the stand-alone client or server editions, but registered users can upgrade for $49.95.

It is also available in network bundles such as a three-user pack priced at $695.

Jensen-Jones, in Red Bank, N.J., can be reached at (908) 530-4666.



The Action feature in Commence 2.0 lets users automate tasks and integrate them with other Windows applications.

Phoenix buys Eclipse to gain foothold in communications

BY SHAWN WILLETT

Phoenix Technologies Ltd., known for its PC BIOS products, wants to be a major provider of a variety of communications software.

To that end, Phoenix purchased fax software maker Eclipse Systems Inc. last week and intends to combine Eclipse's product line with in-house technology to offer DOS and Windows faxing software; a text-retrieval system; and a program that incorporates fax, modem communication, and voice-messaging capabilities.

"The Eclipse brand name will be the leverage for us to establish ourselves in the retail channel," said Steve Kalman, Phoenix vice president of packaged products.

The company had a fax software product of its own, called Phoenix Fax, but it never took off.

"That experience showed us how much we needed to know," said Eric Enge, Phoenix director of communications products. "Part of the attraction of Eclipse is that these guys understand that customer set."

Phoenix will incorporate portions of Phoenix Fax into a DOS version of Eclipse that will be released this summer. An improved version of the Windows program with Phoenix Fax features also will be announced this year.

The company will unveil at spring Comdex this week Eclipse Find, a Windows-based text retrieval product that lets users search, find, retrieve, view, organize, and archive files through various indexes built into each file. It is expected to be in full distribution this summer for a suggested price of $119.

Beyond that, the company will develop software that bundles easy-to-use modem interface software, voice-processing capabilities, and fax send and receive functionality in a single package. The company gave no ship date for such a product.

Analysts believe such products will be the wave of the future.

"More boards are offering modem, fax, and voice [digital signal processing] capabilities together on one chip set," said Judy Pirani, an analyst at BIS Strategic Decisions, in Norwell, Mass.

"It's natural for companies to offer the added features when they bundle their products with the boards," Pirani said.

Phoenix, in Norwood, Mass. is at (617) 551-4000.

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Utility pack boosts dBase's power

BY SCOTT MACE

Borland International Inc. released last week four sought-after utilities for the DOS-based dBase IV 2.0.

The dBase IV Productivity Pack contains a dialog box builder, a multiwindowed editor, a multifile form utility, and a front end for the dBase IV Compiler, which shipped in March.

The multifile form utility allows users to quickly build a master form of multiple detailed records using the dBase IV forms generator.

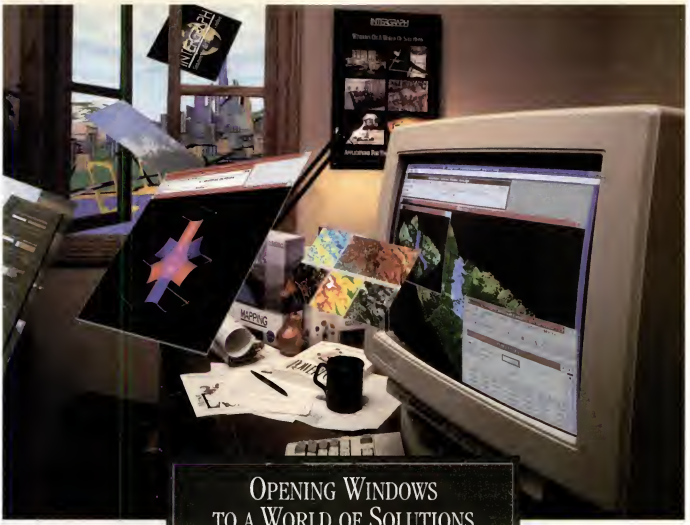
The dialog box builder lets users create dialog boxes with radio buttons, combination boxes, and checklists. dBase IV source code for the multifile form utility and dialog box builder is included in the Productivity Pack, said Vince Mendillo, Borland dBase IV product manager.

The multiwindowed editor, DBedit, exploits cut-and-paste functions as well as the new mouse support in dBase IV 2.0, which currently has an editor that displays only a single window. The editor, written in C, helps dBase IV 2.0 catch up to the native capabilities of FoxPro.

The compiler front end provides a menu interface for running the dBase IV Compiler and its various controls, which until now had to be launched from the DOS command line.

The Productivity Pack, including a dBase IV cross-tabulation utility, is available now for $79.95. Until July 31, it will also be available free on CompuServe.

Borland International Inc., headquartered in Scotts Valley, Calif., can be reached at (408) 438-5300.



Opening Windows to a World of Solutions

In the world of Windows NT, Intergraph's applications bring a new level of power and sophistication to the technical desktop.

Olé OLE

Integrate CAD processing with other Windows applications such as Word and Excel by taking advantage of complete support for Microsoft's Object Linking and Embedding (OLE) technology.

The computer graphics industry has made another leap forward. Under Microsoft's New Technology operating system, popular business programs and Intergraph's technical applications can run alongside each other on the same computer. The same friendly Windows environment appears throughout the applications — word processing, spreadsheets, architecture, civil engineering, mapping, and all the rest. CAD users can now spend time designing and drafting, not navigating through the operating system.

New technology, new opportunities.

The arrival of a powerful new Windows operating environment means that for the first time, hundreds of thousands of microCAD users will have access to the functionality and technical sophistication of Intergraph applications.

Technical leadership.

The list of disciplines addressed with Intergraph software is one of the longest in the industry — and continues to grow.

Aeronautical charting • Architecture • Cartography • Civil engineering • Dispatch management • Document management • Electronics design • Energy exploration • Environmental resource management • Facilities management • Geographic information systems • Image processing • Industrial design • Manufacturing • Mechanical engineering • Photogrammetry • Plant design • Publishing • Ship design • Surveying • Telecommunications • Urban planning • Utilities — gas, electric, water •

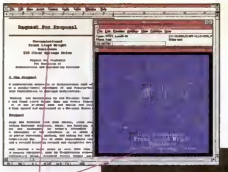
"The Microsoft-Intergraph alliance provides a full range of technical applications, as well as a wealth of personal productivity tools — complete solutions for the technical desktop."

Paul Maritz, Microsoft
Senior Vice President of Systems

Intergraph is the world's largest independent development site for Windows NT applications.

NT

MicroStation is general-purpose CAD software that runs on PCs, Macs, and UNIX workstations. It is a primary tool in Intergraph's solutions for the technical desktop. If you appreciate the economy of PCs but need sophisticated design power, take a look at MicroStation. It means a more productive, more profitable future for you and your company.



LINK TEXT

MicroStation integrates with your favorite Windows business applications.

CAD should give you the productivity edge you need to be competitive in today's business environment. You need a tool that streamlines the process of drafting, as well as a modeler that helps you create virtually any object – fast. You should be able to store design data in relational databases without programming. Your future depends on the ability to share data with your design team and other operations. MicroStation software gives its users this level of proficiency. And keeps them in tune with the best in applications solutions.

"MicroStation includes a robust set of 3D capabilities and gives you a variety of ways to render models."
Infoworld

Intergraph introduces MicroStation Version 5. It brings renowned integration advantages to designers and engineers who need to run in the Microsoft Windows business environment – Windows, Windows for Workgroups, and Windows NT.

Software that puts you in charge.

Today, *user friendly* means more than easy – it means software that empowers you. You control MicroStation through a graphical command center featuring icon command buttons ... pull-down menus ... tear-away palettes ... multiple, resizable overlapping views. The display is sleek. With no perceptible repaint, Version 5's graphical user interface seems to float over your drafting and design area.

MicroStation runs as an extension of the way you work. Choose from unique *Workspaces* designed for your profession. They configure the graphical CAD desktop for you and manage the computing environment to your needs. Even discipline-specific drafting *styles* are provided. And it's all tailorable: Graphically build your own pull-down menus and palettes. Rearrange fields in dialog boxes. Disengage commands. You've got the power to create the interface that best meets the needs of the task at hand.

CAD software should accommodate the way you think, work, learn – even change your mind. You should be able to select a different dimensioning system right in the middle of a command. Or modify a shape and have all of the dimensions automatically change. Simple actions – like grabbing a line or object – should be so fast that they require no conscious effort. MicroStation performs functions like these as a matter of course. Other CAD software simply can't.

A powerhouse of features gives you the productivity edge!

MicroStation offers more functionality in one package than any other CAD software. New *dimension-driven design* options help you design intelligently using geometric and dimensional constraints. Apply variables to the constraints and save your design for reuse with different parameters when creating similar objects or parts. These and more new capabilities – like user-defined linestyles and associative patterning and hatching – provide the most complete drafting environment available.

Powerful tools help you create freeform, mathematically precise surface models. Model virtually any object, no matter how complex. Perform trim, blend, fillet, and Boolean operations between surfaces. You've got the simplicity of solid modeling without the overhead.

Visualizing your designs is easy and cost-effective with MicroStation's new photorealistic rendering capabilities. Light sources, shadows, transparencies, depth cueing, anti-aliasing, and bump and pattern mapping help you market your designs. You can even create flythrough animations and play them onscreen for your clients. MicroStation is a powerhouse of features in one package.

The best tool for the '90s production environment.

Users value the way MicroStation performs in the production environment. On large projects, it's a clean-running, fast performer. One user said, "MicroStation is an all-encompassing system ... capable of covering all facets of project management, not just design and drafting."

MicroStation users enhance productivity through real-time data sharing. True file referencing allows each member of a workgroup to easily and safely share files concurrently with others. It's peer-to-peer sharing of design information while everyone continues working – across multiple hardware platforms and networks.

Run MicroStation with other Windows applications. Cut and paste graphics in a Word proposal. Link document text with your MicroStation design file. Drive MicroStation graphics with an Excel spreadsheet. Embed sounds and messages in your design file. All in all, if you combine MicroStation's integration capabilities with Windows' data sharing capabilities, you've got just what you'd expect from a '90s CAD product. And you have a clear growth path to Intergraph's sophisticated application solutions for UNIX and Windows NT.

MicroStation

MicroStation Version 5 reads and writes to AutoCAD .dwg format.

"Compared to DataCAD, AutoCAD, and VersaCAD, MicroStation is much faster ..."
Computer-Aided Engineering

PC MAGAZINE EDITORS' CHOICE
February 23, 1993
MicroStation PC 4.0.3

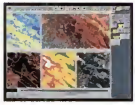
"MicroStation PC is an exceptionally usable, powerful package with such rare and exotic features as non-uniform rational B-splines."
PC Magazine

In some industries, 25 years is not much. In computer graphics, 25 years is the lifetime of the industry. For a quarter of a century, Intergraph has developed computer graphics systems – hardware, software, and support – for industries that rely heavily on maps, engineering drawings, and models to convey information.

Intergraph users range from small offices or departments to large multinational firms, and their projects run the gamut from single drawings to complex aircraft carriers.

Climb the Statue of Liberty, ride Swiss Rail through the Alps, use the 1993 Rand McNally Road Atlas, or take a break with the world's most popular soft drink. In these unexpected places – and hundreds of others – you'll find the results of combining Intergraph's computer graphics experience with users' ingenuity.

With Intergraph's MGE geographic information system, California's Division of Mines and Geology will provide digital maps to enable Californians to determine if they live in risky earthquake or landslide zones.



Low-cost suite of AEC applications

Feature-packed and available at a low cost, Intergraph's MasterWorks applications for architects and civil engineers bring a new level of power and value to the technical desktop. Intergraph brings to the Windows world functions formerly available only in high-end CAD systems. The MasterWorks series includes these applications:

RoadWorks for transportation engineering
DesignWorks for architectural design
CogoWorks for coordinate geometry
FrameWorks for structural modeling
SiteWorks for site design

Gobbell Hays Partners Inc., a 32-person firm, uses MicroStation and ModelView from Intergraph to design laboratories for corporations and universities.

Affordable, expandable geographic information systems (GIS)

With the Modular GIS Environment (MGE) solutions for the PC, Intergraph gives you the best of both worlds – the power of the world's leading GIS on the world's most popular computing platform. Using MGE PC solutions, you can build an integrated, powerful GIS without investing large amounts of time, money, or resources. Start with a single PC and add workstations and sophisticated software as your needs grow. Or expand your existing MGE network with cost-effective PC seats. MGE PC solutions include:

In 39 of the 50 departments of transportation in the United States, Intergraph applications for surveying, civil engineering, and GIS enable the DOTs to design and maintain the nation's transportation infrastructure.

MGE PC-1 for
database creation and project management
MGE Grid Analyst PC for
spatial modeling and analysis
MapInfo for Windows for
desktop thematic mapping
MGE Project Viewer for
read-only database display and query

Designed for Windows NT – the new Technical Desktop Series workstations.

Intergraph has traditionally supplied complete software and hardware solutions. In keeping with this tradition, Intergraph offers its own systems designed for Windows NT. They're optimized for CAD immediately out of the box, with full networking capabilities built in. With an Intergraph workstation, display clarity, high resolution, and graphics performance make viewing your work a pleasure.

These fast, affordable systems are perfect for running the new technical applications from Intergraph, along with thousands of other applications that run under Windows. And workstations in the Technical Desktop Series are fully interoperable with other systems on your network.

Innovative technology – once the domain of high-end systems – is now available on the technical desktop. For a more productive future, this is what you need . . .

Workgroup integration.

Intergraph pioneered reference files, the technology that enables each member of a workgroup to easily share designs with others. And, since .dwg files can also be referenced, you can work with AutoCAD-created data in MicroStation. In the Intergraph distributed computing environment, you share information, printers, plotters, and storage devices – and see dramatic savings in time and money.

Integrated applications.

Intergraph's integrated data management architecture provides access to technical information within applications and across disciplines. This means that Intergraph's applications can address an entire project workflow from end to end. Access to information across disciplines is made even easier by the fact that all applications feature the same easy-to-learn-and-use graphical user interface.

Smooth operation between operating systems.

Many of Intergraph's customers operate on networks that include a mixture of workstations and PCs, so interoperability is essential. Because Intergraph application file formats are common across hardware platforms, there are no problems of data incompatibility or translation, and sharing data is easy. Also, basic Windows NT includes all the tools needed for TCP/IP communication with our UNIX-based systems, so users can mix UNIX-based and Windows NT-based workstations in their networks and enjoy smooth interoperability.

Relational database support.

Intergraph data management tools have built-in interfaces to Oracle, Informix, and other database management products. Support of leading databases in multiple environments lets you create links to them without programming.

Growth path.

If you choose to upgrade your hardware or add other high-end technical applications, Intergraph gives you a growth path. You can upgrade your system and continue to share files.

Open systems and industry standards.

Your investment in hardware and software is protected by Intergraph's continuing support of major standards for computing, networking, drafting, and design.

Value-added services.

Intergraph also provides support in the form of project implementation, customization, systems integration, training, and worldwide service and maintenance.

Call 800-345-4856 for an Intergraph representative in your area.

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INTERGRAPH
Solutions for the Technical Desktop

LOTUS cc:MAIL
Awards (1992-1993)

ComputerWorld I/S Brand Preference Winner, February 1992

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Windows Magazine WinAward, February 1992

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LAN Times Reader's Choice, March 1992, January 1993

•

InfoWorld Product of the Year, March 1992

•

BYTE Magazine Reader's Choice, June 1992

•

BYTE Magazine Award for Cross-platform E-Mail, March 1993

•

Network Computing's Certified Interoperable Application Award, December 1992

•

Network World's Enterprise Technology Award, December 1992

•

Software Digest's Highest Overall Evaluation, 8.7 Rating, 1992

•

MacUser Editors' Choice Award, 1992

•

MacWEEK 1992 Editors' Choice Diamond Award, December 1992

•

UNIX World's Best Product of the Year for 1992, January 1993

MICROSOFT MAIL
Awards (1992-1993)

PC Magazine Editor's Choice Award
October 27, 1992

In the e-mail arena, this is what they call running up the score.

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SAS harnesses client/server for data analysis

By Scott Mace

NEW YORK — SAS Institute Inc. demonstrated client/server processing, imaging, multimedia, and geographic information systems (GIS) for the SAS System at its annual user meeting, held here earlier this month.

The new features position the Cary, N.C., company as an important source of client/server database analysis, according to analysts at the event.

Also shown for the first time were SAS for Macintosh and SAS for Windows NT. The Macintosh demo showed only the core SAS engine, and no ship date was announced. The Windows NT version has now entered limited beta testing and will ship this year, as will imaging and GIS features across all SAS platforms.

SAS will condense research data into vivid animations.

By building multimedia and GIS into SAS, users from corporations and government agencies can create vivid supercomputerlike animations of statistical information for such uses as pollution monitoring. Multimedia will also let users incorporate photos or segments of video- or audio-taped interviews alongside inventories or surveys.

The client/server feature, which SAS calls remote submit, uses SAS' presence on most enterprise computing systems, allowing users to run tasks anywhere on the network where spare computing power is available. The SAS strategy leaves the largest SAS databases on mainframes where I/O is plentiful instead of moving that data en masse to PCs, a process plagued by LAN performance bottlenecks.

"Inadequate answers to these kinds of questions will leave corporate IS disillusioned about the long-term benefits of client/server computing," said Jim Goodnight, SAS president. Servers should provide compute services as well as data services, he added.

Multimedia will let SAS applications condense thousands of pages of research data into short, vivid animations, which will soon be submitted to regulatory agencies such as the Food and Drug Administration, said Martin Rosenberg, president of Majaro InfoSystems Inc. of Mountain View, Calif.

"The FDA has to judge the safety and effectiveness of a new drug before it can be marketed in the U.S.," Rosenberg said. "They can absorb information graphically faster than they absorb words."

Also entering beta is the SAS System for Open Systems, running on IBM's AIX, Hewlett-Packard Co.'s HP-PA RISC hardware, and Sun Microsystems Inc.'s Solaris 2.1, as well as Convex OS, a high-powered Unix system. SAS for Open Systems will include new links to Sybase Inc.'s SQL Server and Oracle Corp. and Ingres Corp. databases. Another option will turn SAS' strong statistical functions into a sophisticated network management system.

Although SAS on Macintosh is new, SAS sells a product unique to the Macintosh, Jmp, specifically for data visualization.

Borland Office goes on sale for $399

Borland International Inc. said it has begun shipping Borland Office and is offering the suite for a special 90-day introductory price of $399.

The Windows bundle, which normally sells for $595, includes WordPerfect, Paradox, and Quattro Pro.

Borland will also offer it for an upgrade price of $299 for anyone who has a DOS or Windows word processing, spreadsheet, database, or presentations program.

Borland, located in Scotts Valley, Calif., can be reached at (800) 252-5547.

— *Shawn Willett*

AN OPEN LETTER TO MICROSOFT

(from the data compression experts at Stac®)

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But, we know you're all busy – you must be answering a lot of tech support calls – so we'll stop here. We just didn't want you to think your customers' data was in jeopardy. No need to thank us, though. It's all in a day's work down here. And cheer up, DOS 5 is still OK.

Sincerely,

Your friends at Stac

P.S. Anyone else who's interested can call 1-800-522-STAC, ext. 6121 (or 619-431-7474) for more information about Stacker 3.1 for Windows & DOS and the Stacker Special Edition.

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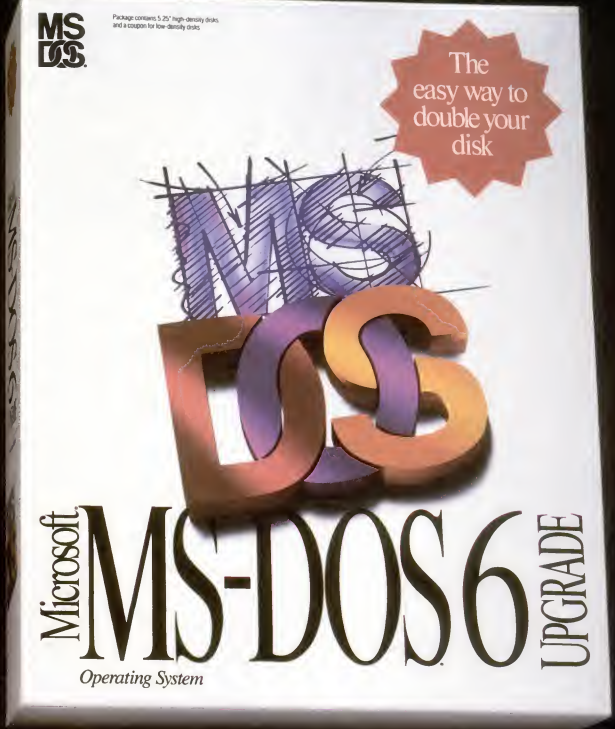

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William Gibson, National Support Engineer, General Electric Medical Systems, told us, "With the integrated disk compression, I get a lot more space. I'm more comfortable with something I know works, and works every time."

And publications like *PC Week, PC/Computing, ComputerWorld, PC World, Corporate Computing,* and *PC Magazine* have all given the MS-DOS 6 Upgrade good reviews.

"It delivers enormous practical benefits and is by far the most compelling MS-DOS Upgrade yet," says Jon Udell of *BYTE* (4/93).

So the MS-DOS 6 Upgrade is proving to be a safe, smart, easy-to-use operating system including integrated disk compression.

Although 90% customer satisfaction is very high, it does leave room for improvement. Despite the fact that MS-DOS 6 has received the lowest percentage of support requests among our top 10 products, the overwhelming customer response caught us a bit off guard. And we weren't able to answer the phones fast enough.

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UniCenter primed to oversee HP and Unix workstations

BY DOUG BARNEY

Computer Associates International Inc. is shipping a monitoring system for Hewlett-Packard Co.'s 9000 servers. A version of CA-UniCenter for HP's 700 Series workstations is expected to ship later this year, as well.

Computer Associates will also port this product to other popular versions of Unix within the next 12 months.

These versions are designed to interoperate, allowing a Unix workstation version to manage an OS/2 system.

Versions are planned for IBM, Sun Microsystems Inc., Pyramid Technology Corp., Sequent Computer Systems, NCR Corp., Data General, IBM's OS/2, Novell Inc.'s NetWare, and Microsoft Corp.'s Windows NT, according to Computer Associates.

HP will bundle the server version with all midlevel and high-end servers, said Alan Paller, Computer Associates director of open systems. When sold separately, the server version is priced from $2,000 to $150,000, depending on configuration.

In addition to determining a workstation's status, the monitoring system can be used to implement security and manage the resources that are available on the network.

The server version handles scheduling and file system security, provides a help desk, and automates operations, which eliminates the need for on-site monitoring.

Many data processing shops charge departments for systems use. To ease the process, UniCenter can track network use, modem use, phone charges, and installed software.

The workstation version, which has no set price, provides security, automated backup, and the ability to schedule tasks from the workstation.

Computer Associates, based in Islandia, N.Y., can be reached at (516) 342-5224.

The UniCenter monitoring system tracks modem use, network use, and installed software.

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DynoPage boosts Windows desktop printing options

Users can create minipages for personal organizers, appointment books, and calendars with a new utility that enhances the printing capabilities of most Windows applications.

DynoPage 1.0 for Windows from Portfolio Systems Inc. enables Windows users to print booklets, manuals, thumbnail proofs, and trifold brochures, said Brian Smiga, Portfolio co-founder and general manager.

First developed for the Macintosh, the print application/driver utility can now be set up to work transparently with Windows applications.

DynoPage takes over an application's print routine and gives the user greater flexibility in how documents are printed, Smiga said.

Dialog boxes allow users to choose layouts and provide information about print options.

DynoPage also gives users the ability to perform double-sided printing or have virtual pages accept multiple pages on a sheet of paper.

The utility ships with more than 200 layouts, including formats for DayTimer, Day Runner, Filofax, Franklin, and other organizers, Portfolio Systems said.

Now shipping, DynoPage 1.0 for Windows retails for $89.95.

Portfolio is located in Cupertino, Calif., and can be reached at (408) 252-0420.

—Jim Hammett

Merger is first step to a consumer orientation for WordStar

By Shawn Willett

The merger of WordStar International Inc. and SoftKey Software Products Inc. will result in a greater consumer emphasis for WordStar's suite of products, according to officials from both companies.

WordStar products now will be sold and promoted through mass merchandisers and other retail stores along with SoftKey's products. There were no immediate plans to drop the products' price.

The software companies announced their merger, which involved a stock swap of about $256 million, on May 14.

WordStar, one of the pioneers in the word processing field, currently sells WordStar for DOS and Windows, UltraFax, PhotoFinish photo enhancement software, and a host of smaller add-on writing aids.

SoftKey, based in Toronto, has a large stable of consumer software, from games to low-end publishing packages, that are sold for between $5.99 and $39.99 through the retail channel.

"The WordStar products will form the high end of our product line," said Kevin O'Leary, president of SoftKey.

WordStar officials said they doubted WordStar and UltraFax would completely fall off the corporate buyer's radar.

"We are not abandoning the corporate market, but our energy is clearly going to be going after the consumer retail channel," said Ron Posner, WordStar CEO.

WordStar has slipped far behind word processing companies such as Microsoft Corp. and WordPerfect Corp. in market share. Last quarter was typical: The Novato, Calif.-based company lost $2.9 million, and revenues fell to $5.9 million.

The newly merged company is expected to announce a major push in selling titles, including multimedia CD-ROMs, at spring Comdex this week in Atlanta.

The merged company, called SoftKey, will be located in Novato.

WordStar can be reached at (415) 382-8000. SoftKey is at (416) 602-5500.

Keyfile integrates paper, electronic forms via DDE, OLE

By Ed Scannell

Keyfile Corp. has announced a program that lets Windows users integrate paper and electronic documents in other Windows applications through Object Linking and Embedding (OLE) and Dynamic Data Exchange (DDE).

With Doceo, users can import documents such as spreadsheets and scan paper pages into an integrated document using Microsoft Corp.'s OLE. Integrated documents can be shared on a network or distributed by electronic mail or fax.

Paperless publishing of documents within workgroups is possible, and users could also add document-centric information to databases and make use of data in documents that were once "orphaned," company officials said.

"We see this as an off-the-shelf product for the single user or small workgroups," said Kim Shah, senior vice president at Keyfile. "But it is also a smooth upward growth path toward our Keyfile WorkGroup and Enterprise Editions [Windows-based workflow products]," he said.

With Doceo's full support of DDE, users can communicate with 3270 emulators, development tools, and Windows-compatible applications. The product also features "doclets" that help manage tasks such as archiving and distributing faxes, creating expense reports, and routing documents.

Users can electronically mark up documents with "sticky notes" that are handwritten or with Keyfile's TypeMatic comments. They can also navigate around large documents with thumbnail views of data by using electronic bookmarks or first and last page buttons.

Doceo can also be used to view documents created with Keyfile Desktop software. Through its Xtensions, Doceo supports high-speed scanning, faxing, toolbars, and optical character recognition.

Priced at $149, the product is scheduled to be released in early summer.

Keyfile Corp. of Nashua, Mass., can be reached at (603) 883-3800, Ext. 377.

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Window Manager / Brian Livingston

Genetically engineered mice run amok at Windows World

Windows World in Atlanta this week has mice unlike anything you have ever seen before.

Personally, I cannot work without at least a three-button mouse, like the ones that come with ATI graphics boards. I use GenSoft Development Corp.'s Whiskers utility ($39.95; at [206] 562-1157) to turn the middle mouse button into a Delete key, which I use often on my tortured prose.

But the rodent state of the art has evolved far past this level.

Appoint, a maker of many meritorious mice, will be introducing a great idea at Windows World: Gliffic Plus, a mouse pad that supports both a mouse and a pen. Whichever device you are currently using is the one that Windows responds to. You can use the mouse for simple menus, then pick up the pen for finer detail, such as positioning desktop publishing objects. Because the pad's own cord plugs into your COM port, the mouse and pen are blessedly cord-free.

I tested the pen under Microsoft's Windows for Pen Computing, a set of routines that you install on top of Windows. The stylus-based environment automatically recognized my pen printing as text. I can envision vertical applications that would use a monitor and this pen/pad combo as the whole interface, dispensing with the need for a keyboard. In a hospital, for example, a workstation mounted in a wall could be used by medical personnel to check off patients' conditions and so on. (Pen Windows' block printing recognition is not, however, sufficient to replace keyboards for touch typing.)

The Gliffic mouse is about half the size of Microsoft's, allowing it to be held like an artist's chalk for greater control, as well as flat on the mouse pad. Appoint also sells this mouse as a corded, standalone unit called the Gulliver ($99 list). The Gliffic Plus pen/mouse/pad is $299.

Appoint's booth at Windows World is W7466, or you can call them at (800) 448-1184 or (510) 463-3003.

A mouse of a different color is sold by ProHance Technologies Inc. It specializes in mice with built-in buttons around the normal left and right ones. Their most popular model, the PowerMouse/100, looks like a mouse on steroids — it has a

ProHance's mouse line includes the PowerMouse and PowerTrack models.

total of 40 buttons. ProHance's president, Kirk MacKenzie, says this model ($175 list) is purchased heavily by spreadsheet jockeys, because the mouse supports an entire numeric keypad, so you never have to remove your hand from the mouse to enter data.

ProHance also makes 12- and 17-button mice ($99 and $125) and a 40-button trackball ($175; see photo). MacKenzie claims to have invented toolbars before they began appearing in Windows applications. He simply placed his toolbars on top of his mice. Talk about information at your fingertips.

ProHance isn't at Windows World but can be reached at (415) 967- 5774.

Neither the Gliffic Plus nor the PowerMouse will be to everyone's taste. The Gliffic's mouse pad, for example, uses absolute rather than relative positioning. This means that each point on the pad represents a specific point on the screen, which you may or may not like. (A relative-positioning driver is in development.) And the PowerMouse takes time to learn.

But these specialized mice might be just what you need if you've outgrown the two-button varieties.

Brian Livingston's new book is Windows Games (IDG Books). *Send tips to: CompuServe 70053,2035; MCI 420-0583; Internet 420-0583@mcimail.com; or fax: (206) 282-1248.*

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Great News! QEMM Solves DOS's Memory Problems!

QEMM Safety in Numbers

Safe Memory Management Keeps Your System Running Smoothly.

What's more annoying than losing work on your PC? A crash or 'hang' destroys everything you've done since the last time you saved. That work is lost forever.

Two major causes of crashes are memory conflicts and running out of memory. To avoid these problems, many users sacrifice productivity-enhancing TSRs or useful network utilities. And that's unfortunate, because the right memory management lets you have it all—safety and performance.

Have Your Cake and Eat it, Too.

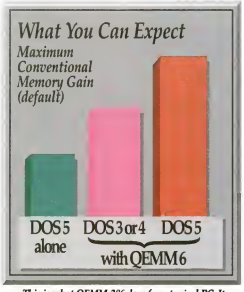
QEMM-386™ version 6 lets you run your favorite programs *and* TSRs without fear of 'out of memory' problems or conflicts. It provides the maximum memory right where your programs need it.

The more memory you have, the more reliability you get. No other memory manager measures up to QEMM's performance.

PC Week Ratings	Alt Charger 386 3.2	Netroom 2.10	QMAPS 2.0	386Max/ BlueMax 6.00	QEMM 6.01	Memory Commander 2.1
Software Compatibility	●	●	◔	●	●	●
Hardware Compatibility	●	◔	●	●	●	●
Reliability	◔	◔	◔	●	●	◔
Ease of Use	●	◔	●	◔	◔	●
Memory Management Flexibility	●	◔	●	◔	◔	●
Quality of Documentation	●	●	●	●	●	●

● GOOD ● SATISFACTORY ◔ NEEDS IMPROVEMENT

PC Week carefully compared them all and rated QEMM-386 v6 the best memory manager.



This is what QEMM-386 does for a typical PC. It reorganizes memory to produce greater speed and safety.

Nobody Knows Memory Like We Know Memory.

That's not bragging, just fact. As recently as two years ago, DOS ignored the importance of maximizing conventional memory. At that time, our QEMM-386 v5 provided up to 128K more usable memory. QEMM became a virtual necessity for 'power users.'

Today, our latest QEMM-386 version 6 surpasses even that achievement. Thanks to our new, smart 'stealth' technology, it finds as much as 96K more high memory than other memory managers. And speaking of other memory managers, not one has yet been able to match our performance. Instead, some have slashed prices or started nasty rumors just because they couldn't reliably deliver the same results. These tactics must not work, since we continue to outsell all the others put together.

QEMM. The Memory Manager Millions Rely on Every Day.

Considering its unsurpassed performance and the safety it adds to your system, it's no wonder that millions of PC owners use QEMM. And it should be no surprise that 'gurus' and MIS managers consistently vote QEMM-386 the top memory manager in poll after poll, year after year.

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In general, you can expect to wait roughly twice as long for a color graphics scale as for gray-scale. With a fast scanner, this difference might translate into a half a minute or so. With a slow scanner, the set up to color may cost you 2 minutes or more.

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scanner excellence), only one-Hewlett Packard's ScanJet IIc-excelled in both categories.

PC MAGAZINE EDITORS' CHOICE

April 14, 1992
HP ScanJet IIc

HP has made scanning as simple as possible.

MVP WINNER

as a whole, and a street price as low as $1,450, and it's hard to imagine a better buy.

An excellent choice for any PC desktop

We'd hate to brag. So we'll let the PC press do it for us.

Both *PC Magazine* and *Publish* called the HP ScanJet IIc the *Best Color Scanner* for 1992. While *PC Computing* named the black & white/gray-scale HP ScanJet IIp the *Most Valuable Product* of the year.

Speed. Simplicity. And accuracy were all applauded. It's no wonder. HP's single-pass scanning delivers both lightning-fast speed and precise color registration. TWAIN support allows scanning without having to switch between applications. And HP AccuPage technology with 400-dpi resolution can tackle the toughest OCR challenges. What's more, capabilities this advanced are now even more affordable. List price on the HP ScanJet IIc has just dropped to $1,599. The HP ScanJet IIp is just $879.

Impressed? Don't just take our word for it, or even the PC press's. Attend one of our scanning seminars that will be held April through September, 1993. To find out more about the HP ScanJet IIc and HP ScanJet IIp or seminars in your area, call 1-800-SCANJET, Ext. 7365. And judge for yourself.

HEWLETT PACKARD

HP ScanJet IIc

HP ScanJet IIp

PIPELINE

SHIPPING

Compaq extends its LTE Lite notebook line

Compaq Computer Corp.'s LTE Lite notebook line was extended with three 486SL-based models. The LTE Lite models measure 8½ inches by 11 inches and weigh as much as 6½ pounds. Each model has an integrated trackball, 4MB of RAM, a floppy drive, a 120MB hard drive, MS-DOS 6.0, and Windows 3.1. Prices start below $2,700. In the LTE Lite series, the 4/25E and 4/33E models have active matrix monochrome displays. The 4/25C and 4/33C models offer active matrix color, and the 4/25 model uses a passive matrix monochrome screen. (800) 345-1518.

Epson America Inc. has introduced two 24-pin dot-matrix printers that offer faster printing speeds and reduced sound levels. The LQ-570+ and the AP-5000+ print at 357 characters per second in draft mode, 7 percent faster than their predecessors. The sound level for both printers has been reduced to 46½ decibels. Both printers are priced at $299 and offer 14 fonts. (800) 289-3776.

Tamarack Technologies Inc. recently introduced a 1,200-dot-per-inch flatbed scanner for the Macintosh and PC platforms. The Tamarack ArtiScan 1200C and Slide Kit can scan 8½-by-11¾-inch surfaces. The 24-bit scanner includes Adobe Photoshop 2.5 for the Mac and Aldus Photostyler for the Windows platform. The ArtiScan 1200C is priced at $1,995; the Slide Kit is $795. (800) 643-0666.

ANNOUNCED

IBM showcases its flash memory card

A PCMCIA 2.0-compatible card with Error Correcting Code memory was shown by IBM Technology Products at the Business Show Tokyo '93 last week. It will feature as much as 20MB of solid-state memory using Toshiba Corp.'s 16MB Flash memory technology. IBM expects to ship the product in volume in the fourth quarter.

MountainGate Data Systems recently announced a hard disk storage subsystem consisting of up to six 3½-inch IncregMeg 6000 removable hard drives. IncregMeg 6000 provides as much as 7.2 gigabytes of on-line capacity and supports Macintosh, DOS, OS/2, Unix, and Sun. It is priced at $19,500. (800) 556-0222.

Compaq tailors Pentium chips

Processors also cater to existing server management systems

BY STEVE POLILLI

Compaq Computer Corp. announced last week Pentium-based desktop and server systems, along with 486SL-based notebooks.

All of the Pentium processors will use the company's proprietary Triflex architecture, which integrates a 64-bit processor bus, a 32-bit EISA I/O bus, and a 128-bit memory bus.

Two new Deskpro/M systems will use Pentium chips — one running at 60-MHz and another at 66-MHz.

Existing Deskpro/M systems can also be upgraded with Pentium processors, Compaq said. The new systems are immediately available.

Base configuration for the 60-MHz system is 8MB of RAM, a 240MB hard drive, 1,280 by 1,024 graphics resolution, business audio, DOS 6.0, and Windows 3.1.

The 66-MHz Deskpro/M has all of the above components with the hard drive upgraded to 510MB and RAM increased to 16MB.

Estimated street prices for the Pentium desktops begin at less than $5,000.

Compaq also brought out Pentium-based ProSignia and SystemPro servers. Three new ProSignias use 60-MHz Pentiums, and a new SystemPro/XL uses the chip's 66-MHz model.

The ProSignia servers are configured with either 8MB or 16MB of RAM, and hard disk storage ranges from a single-drive 550MB unit to an array offering 2.1 gigabytes.

All include a pre-installed NetFlex controller, integrated SCSI-2 controller, and Insight server management software. Prices begin at less than $6,300.

The new 66-MHz SystemPro/XL has 32MB of RAM, a 2.1-gigabyte hard drive array, a pre-installed SCSI array controller, and server management software.

The system will likely sell for less than $18,000.

Compaq is based in Houston and can be reached at (800) 345-1518.

The end of the beginning for Intel's Pentium

Intel finally dropped the other shoe last week, as the company announced pricing and (limited) availability for its Pentium processor. That move opened the gates for a flood of announcements from manufacturers.

Pentium specs
60-MHz and 66-MHz clock speeds
16KB cache
Floating-point unit
Superscalar design
64-bit external memory interface
3 million transistors
100 to 112 million instructions per second
Performance (v 1.1 Dhrystone)

Price per thousand
60 MHz — $878
66 MHz — $965

Although computer companies are jumping on the bandwagon immediately, the Pentium will be in short supply initially. Only 10,000 chips will ship this quarter, with the supply expected to grow to 60,000 to 70,000 units for the third quarter.

BILL MARTIN

PC alliance challenges Mac for color throne

BY CATE CORCORAN

Three companies have banded together to offer PC desktop publishers some of the Macintosh's ease of use.

Adobe Systems Inc., Dell Computer Corp., and SuperMac Technology will promote professional color desktop publishing on the PC platform, which the companies plan to announce at spring Comdex this week.

In June, Dell will ship two systems with pre-installed software and hardware configured for color graphics and prepress work.

The Dell systems are optimally configured for the best performance, so users don't have to put the pieces together themselves, said Tom Clarkson, SuperMac director of Windows products.

Dell, Adobe, and SuperMac are joining forces to try to match the Mac's integration.

"Most people in our target market don't read the documentation and don't want to fool with it," Clarkson said.

The systems cost less than equivalent Macs, according to the companies, and come with the software that is most popular on Macintoshes.

"We believe Windows — from a financial standpoint — is a much better choice," said Susan Spencer, Adobe product marketing manager. "I don't think people are ready to give up their Macs, but when they're making a new capital equipment purchase, they have to consider the price of the PCs."

Both Dell Power Publishing Workstations come with SuperMac 17-inch color monitors and a Microsoft mouse.

On the software side, users get a choice of Aldus PageMaker or QuarkXPress. Also included are Windows versions of Adobe Illustrator 4.0, Adobe Photoshop 2.5, 200 Adobe fonts, Adobe Streamline, Adobe Type Manager, and Adobe Type-Align.

The Dell Power Publishing SuperStation is a 486DX2/66-based EISA system with 32MB of RAM, a 535MB hard disk, and a SuperMac Thunder/24 EISA video card with color calibration software. It lists for $8,995.

The Dell Power Publishing Workstation, which lists for $6,695, features a 33-MHz 486 processor, 16MB of RAM, a 230MB hard drive, and a SuperMac Spectrum/24 EISA video card. An optional 20-inch monitor costs $1,500 more.

Dell, in Austin, Texas, is at (800) 289-3355.

Cyrix processor series preserves time and conserves energy

BY TOM QUINLAN

Chip manufacturer Cyrix Corp. released this week a family of processors that offer improved performance and power-saving features.

The Cx486S series is Cyrix's first to offer the design that Intel Corp.'s 486SX line uses, making it easier for system manufacturers, and eventually customers, to upgrade existing designs and systems.

Cyrix is also offering higher performance chips that include clock speeds of 33 MHz and 40 MHz, as well as clock-doubling SX models running at 40 MHz and 50 MHz internally while fitting into external 20 MHz and 25 MHz systems.

Rounding out the line will be two 3.3-volt processors running at 25 MHz and 33 MHz and designed for use in green PCs, systems that meet the energy requirements of the Environmental Protection Agency's Star program.

Cyrix has also introduced four math coprocessors designed to work with the SX-compatible processors, in both 3.3-volt and 5-volt configurations.

Several companies, including Amax Engineering Corp., Micro Express Inc., and Tangent Computer Corp., today will announce products based on the Cyrix 40-MHz 486S.

Prices for the processors range from $139 for the 3.3-volt 25-MHz 486S and the 5-volt 33-MHz 486S to $199 for the clock doubled 25/50-MHz 486S2 chip.

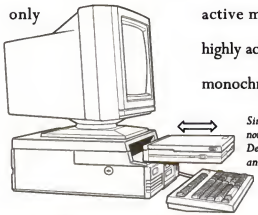
The $179 40-MHz 486S is in volume production now.

THE COMPAQ LTE LITE. FOR THEIR TIME WORKING. AND

OK, we're not saying you live on three hours of sleep, or that you eat Chinese takeout every night. And even if you do, we're not saying that a COMPAQ LTE Lite 486SL notebook is suddenly going to change all that.

What we will say is that it could make your life a lot simpler. Particularly if you travel.

You see, on one hand, these new computers are lightweight, compact notebooks (6.3 pounds, 8.5"x 11"). They're available with three different screens: the COMPAQ UltraView – the world's only black and white, active matrix VGA; a 256-color active matrix; and the highly acclaimed passive monochrome MaxLight.



Simply slide the LTE Lite notebook into the COMPAQ Desktop Expansion Base and you have a full-function, fully connected desktop computer.

There's the integrated EasyPoint trackball. And each has a range of innovative power-conservation features to help extend battery life.

But what also makes these notebooks unique is

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PEOPLE WHO SPEND HALF THE OTHER HALF WORKING.

that they double as full-sized, full-featured 486 desktop PCs.

By simply sliding your LTE Lite notebook into

the COMPAQ Desktop Expansion Base, you're instantly connected to printers, peripherals and your network. No floppies, no fumbling with wires, no headaches. And the extra slots and drive bays increase expansion capabilities. Best of all, you're using the same hard drive. So whether you're in the office or on the road, your files are always with you. The expansion base also offers you a keylock to secure your notebook.

Of course, if you don't need all the functions of a full-sized PC, but want easy connection to your peripherals, choose the new Enhanced QuickConnect – a one-step system with integrated Ethernet and SCSI support.

And like all of our PCs, these notebooks are backed by CompaqCare. Which includes a free, three-year worldwide warranty, and a year of free on-site* service in the U.S. or Canada.

For information on the COMPAQ LTE Lite 486SL, call 1-800-345-1518. Because if you work out of the office on a regular basis, you really lead two lives. So they're perfect for you. And you.

COMPAQ

Unlike other 486 chips, the Intel 486SL, with an integrated numeric coprocessor, provides higher performance and extended battery life.

No wires, no interface boxes, no headaches. The optional fully integrated COMPAQ SpeedPAQ 144 Modem connects the LTE Lite directly to a cellular phone so you can send e-mail and faxes.

*This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

Toshiba notebooks to sport Intel chip

BY YVONNE LEE

The latest notebooks from Toshiba America Information Systems Inc. feature Intel Corp.'s new 3.3-volt 486SX microprocessors in addition to options for high-quality color.

The notebooks include two low-priced 20-MHz 486SX systems and two 33-MHz 486SL systems. The systems come with 4MB of RAM and DOS and Windows installed.

Toshiba's value-priced Satellite T1900 systems include a monochrome model and a color system that uses the company's proprietary passive matrix screen technology, called Dynamic STN. (See "Toshiba notebook sports color, 486 power, low price," May 10, page 1.)

The color system is designed to offer speed and clarity similar to active matrix color systems but without the wide viewing angle of active matrix.

The notebooks' nickel-metal-hydride batteries can last for 5 hours, the company said.

Toshiba's T1900C features the company's STN color screen for less than $3,000.

Both models include a 14½mm PCMCIA slot and offer 120MB and 200MB hard drive options. The T1900 is also available with an 80MB drive.

The company estimates street pricing for an entry-level T1900 at between $1,650 and $1,800. A color T1900C with a 120MB hard drive will cost between $2,450 and $2,700.

T1900 and T1900C notebooks with 120MB hard drives are available now; other versions will ship by the end of June.

At the high end, Toshiba is introducing the T4600 series with monochrome and active matrix color screens.

The color T4600s use a nickel-metal-hydride battery that has a life of more than 2½ hours, and the monochrome model uses a standard nickel-cadmium battery with a 3-hour life.

The monochrome T4600 comes with a 120MB or 200MB hard drive. The color T4600C adds a 340MB hard drive option. Both have two PCMCIA slots: a standard Type II and a 16mm slot.

Pricing for the T4600 begins at $3,299. The color T4600C starts at $4,699.

Systems with 120MB and 200MB drives will ship in June. The 340MB hard drive will ship at the end of July.

Toshiba, in Irvine, Calif., is at (800) 334-3445.

AST discloses its Pentium chip strategy

BY STEVE POLILLI

AST Research Inc. last week unveiled its Pentium chip strategy as it announced server and desktop systems that use the new 64-bit Intel processor on an add-in board.

Expected to ship in July, the new systems include versions of AST's Premium SE server, Manhattan SMP symmetric multiprocessor server, and Premmia desktop.

The Premium SE P/60, the Premmia P/60, and the Manhattan will use the 60-MHz Pentium processors initially.

"There are a lot more 60-MHz chips available than there are 66-MHz chips," said Bill Greenlund, AST product marketing manager. "When availability picks up in September or October, then we'll come out with the 66-MHz systems."

The Manhattan server, with prices beginning at $32,000, can accommodate as many as four Pentium chips, 448MB of RAM, and a maximum of 16 gigabytes of internal storage.

The Manhattan server will be upgradable to the Pentium processor with the use of add-in boards, according to AST.

Each Manhattan Pentium board has a processor, a 64-bit data bus, a 32-bit address bus, and a 256KB writeback cache.

The Premium SE P/60 server has a base configuration of 16MB of RAM, a 256KB cache, and eight EISA slots. Depending on configuration, the Pentium-based Premiums range from $7,500 to $9,500.

The Premmia P/60, priced from $5,500 to $8,000, comes with 16MB of RAM, local bus video, a floppy drive, four EISA slots, five drive bays, and a 256KB cache on a 64-bit bus.

AST, in Irvine, Calif., can be reached at (800) 876-4278.

HP to use Pentium in NetServer

BY TOM QUINLAN

Hewlett-Packard Co. will take advantage of Intel Corp.'s Pentium processor to launch a new server line.

HP's NetServer LM series features not only the Pentium chip but a new dedication to "maximum uptime" with hot-swappable drives and Error Correcting Code (ECC) memory.

The NetServer LM models will come in three basic configurations, with 16MB of standard dynamic RAM, eight drive bays, and either a 33-MHz 486DX, a 486DX2/66, or a 60-MHz Pentium processor. The servers will ship in June.

Options such as the ECC memory, a board-level Pentium upgrade, and a dual-processor Pentium system will be available in the third quarter.

Prices range from $3,799 to $12,549. A Pentium-equipped system with a 535MB hard drive lists for $7,099.

HP has also introduced the NetServer LE low-end server line with a 33-MHz 486SX and 486DX or a 486DX2/66 processor, which starts at $2,099.

The systems come with a Pentium OverDrive socket.

Both lines can be used with HP's NetServer Assistant software, a network management tool that works with NetWare 3.11.

The software includes HP's OpenView 7.0 and is designed to provide network managers with remote diagnostic tools, storage planning, and remote configuration and rebooting.

NetServer Assistant will be bundled with LM servers when the software ships in August. The cost for LE buyers is $495.

HP, in Palo Alto, Calif., can be reached at (800) 752-0900.

Gateway slashes notebook and 486 prices

BY KELLEY DAMORE

Last week Gateway 2000 Inc. customers were offered new product configurations and price reductions on the company's notebook and 486 systems.

Gateway now has a less expensive 66-MHz 486 offering that comes with less RAM and a smaller monitor. The new configuration offers 8MB of RAM as opposed to 16MB and comes standard with a 14-inch, 1,024-by-768 noninterlaced CrystalScan monitor. This $2,495 setup also has a CD-ROM drive and a 340MB integrated drive electronics (IDE) hard drive.

In addition, the system has accelerated video with 1MB of dynamic RAM on a VL Bus. Microsoft Corp.'s DOS 6.0, Windows, and Multimedia Works are also included, officials said.

The existing 4DX2-66, priced at $2,995, offers some enhanced features with 16MB of RAM, a 256K cache, and a CD-ROM.

The company also reduced the price of its 4DX2-50V by $200, to $2,295. The system has 8MB of RAM, a 64K cache, a 212MB hard drive, an ATI Ultra Pro local bus video card, and a 15-inch CrystalScan 1572FS noninterlaced monitor.

The company's 4DX-33 dropped $100, to $1,895. The unit comes with 8MB of RAM, a 64K cache, a 212MB IDE hard drive, and a 14-inch CrystalScan monitor.

Gateway also unveiled a $1,295 25-MHz 486 machine that comes with 4MB of RAM and an 80MB hard drive.

Its notebook offering, the Gateway Nomad 450DXL, is now available with 4MB of RAM and a 120MB hard drive for $2,495. The existing model, priced at $2,995, comes with 8MB of RAM and a 200MB hard drive.

The 50-MHz 486DX2 notebook comes with a 3½-inch floppy drive, a backlit 10-inch VGA screen, one parallel and one serial port, a 79-key keyboard, a pointing device, MS-DOS, Windows, and Works for Windows.

The Nomad notebook weighs 5.6 pounds and runs for as long as 6 hours on a nickel-cadmium battery.

Gateway, of North Sioux City, S.D., can be reached at (800) 523-2000.

Product Spotlight

NCR unveils 3150 notebooks

NCR Corp. today formally introduced its 3150 line of upgradable notebooks. They come with monochrome, passive matrix color, or active matrix color displays. The monochrome version can be upgraded.

They all come with DOS 6.0, Windows 3.1, and BitFax 2.0. They work with the WaveLAN/PCM-CIA card, announced today. The monochrome model with 4MB of RAM, an 80MB hard drive, and nickel-cadmium battery is $1,925. An active matrix color model with 4MB of RAM, a 170MB hard drive, and nickel-metal-hydride battery is $3,805. (800) 647-2600.

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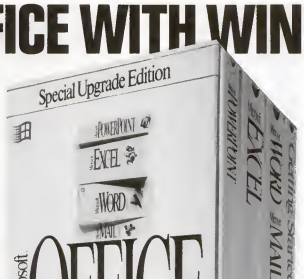

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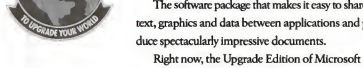

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BRAND MANAGER
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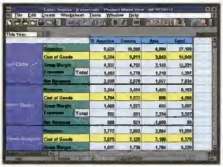
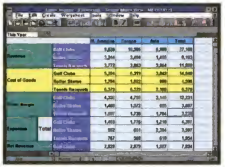
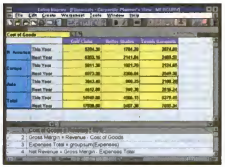


DYNAMIC VIEWS IN ACTION. VIEW 1 IS A SPREADSHEET BY PRODUCT (FOR BRAND MANAGER).



JUST DRAG AND DROP AND IMPROV INSTANTLY BUILDS VIEW 2, BY LINE ITEM (FOR VP OF MARKETING).



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INFO WORLD

Users discover flaw in Dell 486/33's chassis

Won't close after adding boards

BY STEVE POLILLI

A number of Dell Computer Corp. Dimension 486/33 midsize systems are experiencing problems caused by an improperly manufactured chassis, the company said last week.

Users realize the chassis is not molded properly once several expansion cards are installed, particularly when full-size boards are installed at both ends of the six-slot area.

The company is shipping replacement systems to customers reporting defective chassis, and the manufacturing process has now been corrected. The chassis are manufactured for Dell by an Alabama company.

Mike Goldberg, PC systems manager at Learning Group International, in Los Angeles, said it didn't take long to discover the problem in four Dimensions he bought from a local retailer in early April.

"I got them and tried to put in the boards," Goldberg said. "When the cards were in, the back cover wouldn't come down and the connections couldn't be made. We took them back to [the retailer] and they gave us different systems. But they had to bend the brackets to get the boards in."

In a later call to Dell's support line, the company confirmed Goldberg's suspicion that the problem resided in the system, not in the boards. Goldberg has since received replacement PCs.

A representative of the Austin, Texas, company said the company has received fewer than 30 support calls on the problem. No similar problems were reported with small-footprint or floor-standing 33-MHz 486 Dimension systems.

Dell can be reached at (800) 289-3355.

DEC rolls out RAID mass storage system

BY JAYNE WILSON

Digital Equipment Corp. is now shipping a modular subsystem that can provide PC LANs with as much as 4 gigabytes of storage and protect users from disk failures.

DEC's StorageWorks RAID Array 110S supports Novell Inc.'s NetWare and SCO Unix servers and is based on redundant array of inexpensive drives (RAID 5) technology.

"Should one disk fail, the data on it won't be lost," said Anne Blanchard, StorageWorks product marketing manager. "The 110S uses the remaining disks to store parity data about the failed disk and to rebuild the data."

The product's modular design allows users to easily remove failed disks and snap in new ones. All of the product's components, including controllers and power supplies, are in snap-in carriers.

"This gives the desktop user a high-availability solution without sacrificing any of the server's processor capability," Blanchard said.

StorageWorks incorporates a Motorola MC68E1 processor and is based on SCSI-2.

The 110S can be managed from any terminal or PC attached to the server. It includes utilities to assist with setup and with management once installation is complete.

The StorageWorks RAID Array 110S comes with redundant power supplies and the RAID controller.

It is available in a 2-gigabyte system that contains five 425MB disks and is priced at $15,100.

A version with five 1-gigabyte drives is available for $19,400.

Additional 1-gigabyte drives are $2,694 each; 425MB drives are priced at $1,524 each.

DEC, in Maynard, Mass., can be reached at (508) 841-5365.

HP is hoping to put color on the desktop with its DeskJet 1200C and 1200C/PS ink-jet printers.

HP color DeskJets priced for offices

Powered by 11-MHz i960 chip

BY KELLEY DAMORE

Hewlett-Packard Co. this week will debut its next-generation color ink-jet printer, a device that could propel color to the corporate desktop.

"This printer will serve as a means for offices to introduce color into [business documents] at a reasonable cost, " said Marco Boer, senior analyst at International Data Corp., in Framingham, Mass.

The DeskJet 1200C and the DeskJet 1200C/PS offer 7-page-per-minute (ppm) monochrome printing speeds and 1 ppm in full color.

The printers sport 600-by-300-dot-per-inch resolution and are based on an Intel i960 11-MHz processor. Both come standard with 45 scalable fonts (35 Intellifont and 10 TrueType typefaces), PCL5 enhanced for color, and a 180-sheet input tray.

The 1200C has 2MB of memory, and its PostScript cartridge part, the 1200C/PS, offers 4MB of memory, PostScript Level 2, and a LocalTalk interface with automatic language and interface switching.

A Centronics parallel port and modular input/output (MIO) slot are standard.

The MIO slot can use HP's JetDirect cards that support Ethernet, Token Ring, Novell Inc.'s NetWare, IBM's LAN Server, and Microsoft Corp.'s LAN Manager, Windows for Workgroups, and Windows NT.

The slot also supports EtherTalk, HP-UX, and TCP/IP for SunOS, Solaris, and SCO Unix protocols. IPX/SPX and DLC/LLC protocols are also supported.

The DeskJet 1200C is priced at $1,699; the 1200C/PS is priced at $2,399. They are available immediately through dealers and distributors.

Hewlett-Packard of Palo Alto, Calif., can be reached at (800) 752-0900.

Vendors compete on price of 486 notebooks

BY YVONNE LEE

Prices of 486-based notebooks have plunged below the $2,000 mark, as evidenced by two systems that recently began shipping.

Keydata International Inc.'s $1,995 Keynote Force comes with a 33-MHz Intel 486DX microprocessor, which users can upgrade to a 50-MHz 486DX.

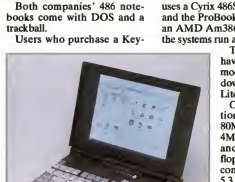
Cube Computer Corp. is shipping a $1,795 486SLC-based notebook computer, the ProBook 425NTX, as well as a 386 notebook for $1,595.

Both companies' 486 notebooks come with DOS and a trackball.

Users who purchase a Keynote Force notebook can upgrade its removable 120MB hard drive with a 200MB or 340MB drive. They can also replace the 10-inch monochrome screen with an 8½-inch active matrix color display. The floppy drive also snaps out, allowing users to pop in a PCMCIA Type II chassis.

A Keynote Force notebook with the standard 4MB of RAM and 120MB hard drive, but with a color screen, costs $3,695. The 5.7-pound computer ships with Lotus Organizer software.

The Cube ProBook 425NTX uses a Cyrix 486SLC processor, and the ProBook 325NTX uses an AMD Am386SXL. Both of the systems run at 25 MHz.



Cube Computer's ProBook 425NTX features a 25-MHz Cyrix 486SLC processor.

The ProBooks have a built-in fax/modem with Windows and WinFax Lite software.

Other specifications include an 80MB hard drive, 4MB of RAM, and an internal floppy drive. Each computer weighs 5.3 pounds.

Keydata of Plainfield, N.J., can be reached at (800) 486-4800. Cube Computer of Elmsford, N.Y., can be reached at (800) 522-2823.

Acer R4000s will run Windows NT

BY CATE CORCORAN

The trickle of RISC platforms that will run Windows NT continued last week with an announcement from Acer America Corp.

The company plans to ship late this month four AcerFormula systems, all based on the R4000 or R4400 processors from MIPS Computer Systems Inc.

A copy of Windows NT that runs on the MIPS processor will be included with each system when that OS ships.

The Acer systems are aimed at in-house and commercial software developers. They can also be used as network servers for small workgroups or departments, Acer said.

The AcerFormula computers are unusual in that they have graphics accelerator cards on a 64-bit local bus and Ethernet and SCSI-II on a 32-bit local bus.

All the systems have 16MB of RAM, 128KB of secondary cache, a CD-ROM drive, a 3½-inch floppy drive, and a 101-key keyboard.

An AcerFormula based on the 50-MHz R4000 chip will list for $3,349. With a 240MB SCSI-II hard drive, the system will cost $3,599.

An AcerFormula based on the latest generation 66-MHz R4400 chip will list for $3,999 without a hard drive. A model with a 240MB SCSI-II hard disk will list for $4,599.

Acer, located in San Jose, Calif., can be reached at (408) 432-6200.

NCR puts Pentiums in scalable, multiprocessing PC line

By Yvonne Lee

Multiprocessing servers from NCR Corp. are targeted at buyers who want to use one platform from their enterprise systems clear down to departmental servers.

"This allows very large customers to have scalability," said Candis Cook, director of product management and market planning for general-purpose products in NCR's workstation products division.

The recently introduced servers include five different models that can use two to 16 processors, depending on the model.

The dual-Pentium model will be sold as either a workstation or a server, depending on configuration.

Configured as a workstation, the Model 3360 has a 535MB hard drive, a 600MB CD-ROM drive, an Ethernet or Token Ring network adapter, five MicroChannel expansion slots, and seven drive bays. It can have 8MB to 512MB of RAM.

With Windows NT preloaded and a 19-inch display, the 3360 costs between $18,000 and $20,000.

The 3360 is targeted at developers who want to create multithreaded applications. Developers can disable one of the processors to test the client side of the application, Cook said.

A similarly configured server, the Model 3430, will be priced between $25,000 and $75,000.

The Model 3455 departmental server can have from one to six Pentium processors. It is offered with 16MB to 1 gigabyte of RAM, and its internal disk drives store 500MB to 14.4 gigabytes of data.

The system uses NCR Unix System V, Release 4 MP-RAS and Windows NT and costs from $45,000 to $400,000.

At the higher end, the Models 3525 and 3555 use a maximum of eight and 16 Pentium processors, respectively. These computers can cost from $90,000 to more than $1 million.

NCR, in Dayton, Ohio, can be reached at (800) 225-5627.

Compudyne's power-saving 486SL/25 lists for $1,999 and includes an 80MB hard drive.

3.6-pound system has 25-MHz 486, 80MB hard drive

A subnotebook that packs its 486 power into a 3.6-pound package ships today from Compudyne Inc.

The Compudyne 486SL/25 Subnote uses a 3.3-volt architecture, enabling its nickel-metal-hydride battery to last more than 4 hours, according to the company.

The Subnote also has an optional AA battery adapter for using off-the-shelf batteries that would last about 2 hours, said product manager Mark Nicotera.

The $1,999 subnotebook has a built-in trackball and includes the Lotus Organizer personal information manager, DOS, and Windows.

Although the computer has a full-sized 79-key keyboard, its VGA screen measures only 7½ inches diagonally.

It has a removable 80MB hard drive that users will be able to replace with 120MB drives once Toshiba America Information Systems Inc. ships the larger drives in late June, Nicotera said.

The subnotebook's 4MB of RAM can be expanded to 20MB. It has a PCMCIA Type II slot and a slot for a proprietary $139 internal 9,600-bit-per-second (bps) fax and a 2,400-bps data modem.

Other options include a fast charger and spare compact charger.

Compudyne, in Dallas, can be reached at (800) 932-2667.

— Yvonne Lee

Hewlett-Packard's managed 10 Base-T hubs will meet all of your expectations.

Except one.

[1]U.S. list price for HP EtherTwist Hub Plus 48. HP managed 12 expert hub: $1,595. [2]Based on U.S. list prices of 1 HP-10 HP EtherTwist Hub Plus 48, SynOptics 2813-04 and 28020, 3Com 3C-FMS TP. Cabletron MRD-2. [3]IDC 1992 report on worldwide shipments of managed non-modular hub market. [4]In Canada call 1-800-387-3867 Dept. 186. ©1993 Hewlett-Packard Company

Tech Talk / Steve Gibson

WinScope helps give your applications some extra Torque

It's amazing how quickly the minimum acceptable appearance of a Windows application has evolved and matured.

Just a short while ago, having a shadowed push button that went in and out as the mouse was clicked was amazing. Today, however, our buttons need to have disembodied color swatches floating over their surface with synchronized drop shadows, our dialog boxes need to have that chiseled steel gray appearance for grouping related controls, and all of the various controls need to interact and work together just so.

Programming Windows was never for the fainthearted, and today it's even less so. If you downloaded and experimented with Torque, my little Windows pixel throughput measurement utility, you may have noticed these sorts of extras, which combine to make a Windows gadget work better than most users expect. Torque connected its keyboard shortcut keys to their buttons so they would be pressed in on-screen as they were depressed on the keyboard. It changed a set of regular push buttons into "radio-selector buttons," where pushing another in popped out the one that had been in. It defeated the keyboard's auto-repeat where repeating wasn't desirable, and it provided sophisticated three-dimensional chiseling for control and display field coloration, all without add-on Dynamic Link Library modules or other help.

Many readers wrote to me asking if the source code for Torque was available, stating that they had been wanting to incorporate similar user-interface "fanciness." Because the solutions I employed with Torque were specific to its needs, it's not clear that they would have translated well to other uses; however, today I can share some news with you that's far more generally useful than Torque's source code would be:

I've just been released from my nondisclosure agreement on WinScope, a new killer product from The Periscope Co. More than any other single resource, WinScope has helped me understand many subtle and deep aspects of Windows operation. Its use unlocked many obscure Windows secrets and allowed Torque, written in plain old C, to behave just the way *I* wanted it to.

The Periscope Co. is not new to in-depth software analysis. I first discovered and fell in love with Version 1.0 of its well-known debugger, Periscope, eight or nine years ago when I began programming the PC platform. I've checked out all the various other debuggers as they've clamored for my keyboard, but Periscope is the one I've stayed with.

As Windows began dominating the desktop and developers began moving in that direction, it was only natural for The Periscope Co. to turn its talents to Windows. I'm glad they did. WinScope is a fabulous and easy-to-use yet comprehensive and powerful Windows probe that intercepts and displays Windows' heartbeat: the critical Windows messaging traffic that drives all Windows applications and the Windows system itself.

Windows probes are such a necessity for any level of Windows development that WinScope is not alone. Jeffrey Richter has created a nice probe called Voyeur, Microsoft's Software Development Kit includes the Spy utility, and Borland bundles WinSight with its Windows language development products. Even so, I feel WinScope stands alone as a full-featured probe bristling with extras and is easily worth its $99 (half-off) introductory price, good through June. Whether you are struggling with Windows or don't know where to begin, WinScope deserves a hard look. You can contact The Periscope Co. at (404) 875-8080 or send them a fax at (404) 872-1973.

By the way, Smart Prompt, the Smart Drive prompt-return cache flushing TSR that I mentioned last week, is located on CompuServe in Data Library 1 of the IBMHW forum under the name SMARTP.COM.

Steve Gibson is the developer and publisher of SpinRite and president of Gibson Research Corp., based in Irvine, Calif. Send comments to him at MCI Mail 489-9468 or steve@grc.com on the Internet.

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HEWLETT PACKARD

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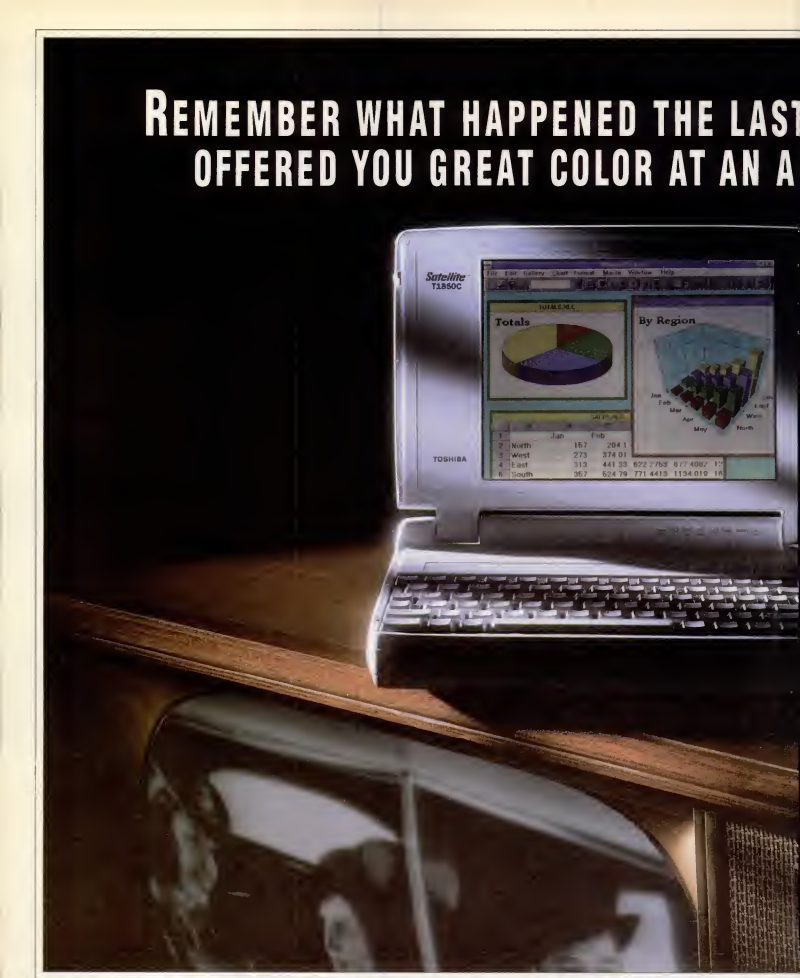
OFFERED YOU GREAT COLOR AT AN A



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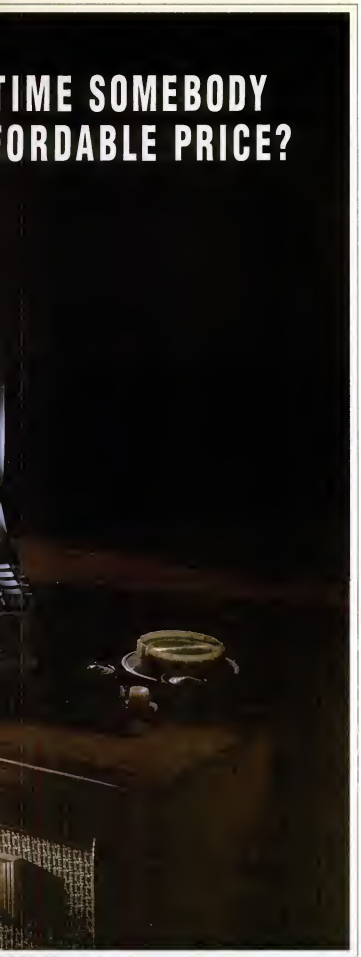

The Satellite series features our MaxTime™ power management system that gets the maximum out of every battery charge.

You can get pre-installed software like MS-DOS® 5.0, Windows® 3.1 and a trackball that are a $300 value.

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intel inside

When the first color television came out, black and white was history. This is another red letter day in the march of technology.

With the new Satellite T1850C, our engineers have developed, quite simply, the best color STN screen available on any notebook. Period. Yet the way it's priced, we believe, represents an even more significant achievement.

Because the T1850C gives you Toshiba's renowned technology and superior performance in a color notebook, for what you'd expect to pay for an ordinary monochrome notebook.

To start with, we've made the screen a full inch larger than many other color notebooks (9.5 vs. 8.5). Flip on the power and that incredible brightness you see is the result of two new CCFL tubes that provide the light source. In addition to increased brightness, these tubes also give you even lighting across the screen, to effectively eliminate dark spots.

We've also utilized an improved color filter for eye-popping richness and purity of color. And with a contrast ratio of 10:1, colors have never been more distinct.

Of course, like other notebooks in our Satellite series, the T1850C comes with a rapid fire 25MHz 386SX microprocessor, 4MB of RAM that can be expanded to 12MB and your choice of an 80MB or 120MB hard drive.

But for a true picture of just how great the color on the T1850C is, we invite you to place it side by side with other color notebooks. A demonstration that should convince you not only are ordinary monochromes on the way out, but a number of ordinary color notebooks as well.

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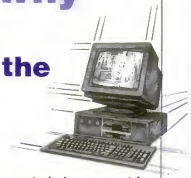
Perspective 93

The seven reasons why Perspective 93 is the place you must be June 6-9:



1 Because you can learn everything about networked PC systems in a client/server environment.

This is the stuff you really do have a need to know. And we have the people who know it inside out, from the top down and bottom up. People from the companies who have been on the leading edge of designing and using networked PC systems in a client/server environment. And they're prepared to share their solutions. Don't be caught with your knowledge level down. Get Perspective.

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PathWay Messaging ported to SunSoft

The Wollongong Group Inc. has ported its electronic mail system, PathWay Messaging, to SunSoft's Interactive Unix System V, Release 3.0. Pathway Messaging complies with X.400 standards for Message Handling Services, X.500 standards for Directory Services, and U.S. Federal Information Processing standards for TCP/IP and Open Systems Interconnection coexistence. The E-mail backbone comes in client and server versions, priced at $195 and 9,495, respectively. (415) 962-7100.

The Net Solution card, priced at $199 per user, includes software for sharing printers, exchanging E-mail, and transferring files across a LAN. The card, which is scheduled to ship in mid-June from Connexperts Inc., plugs into a PC without user configuration. Net Solution supports as many as 254 users, and the cards may be linked in a daisy chain or star configuration. (800) 433-5373.

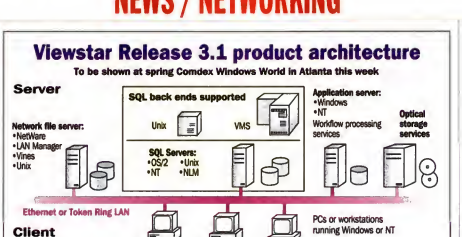
Two new print servers shipping in June from Digital Products Inc. will provide users with faster printing capabilities for Banyan Vines networks. NetPrint/100 for Vines, priced at $895, is an external device that connects one or two printers to an Ethernet or Token Ring network. The $795 JetXPrint/100 installs in Hewlett-Packard Co.'s MIO printers, such as the LaserJet 4Si, to connect the printer directly to the LAN. (800) 243-2333.

PRICE CUTS

3Com cuts price of hub, LAN manager

3Com Corp. has reduced the price of its fiber-optic hub and its network management software. The LinkBuilder FMS TP twisted-pair stackable hub is now available for $995. Pricing for isoview, the company's network management software, has been reduced to $645. (800) 638-3266.

Dayna Communications Inc.'s DaynaPort adapters, which support 10Base-T thick or thin Ethernet, are now priced at $229. New features for the DaynaPort adapter line include compatibility with the Apple Ethernet driver, installation of drivers in ROM, and support for Apple Computer Inc.'s Simple Network Management Protocol agents. (201) 269-7394.



ViewStar to bring enterprise workflow suite to Windows NT

BY CHERYL GERBER

ViewStar Corp. is set to roll out an enterprise workflow package for Windows NT that could dramatically reduce corporate users' document management costs.

ViewStar, Release 3.1, which will debut this week at spring Comdex, includes document database management, distributed optical storage, and workflow task processing software.

In addition to supporting a number of LAN servers and topologies (see chart), ViewStar supports IBM's DB/2 and Gupta's SQLBase. It will support Sybase on OS/2 and run as a NetWare Loadable Module on the IBM RS/6000 in June, said Barbara Wehrle, corporate marketing director of the Emeryville, Calif., company.

Using ViewStar's current Windows version, Plaza Home Mortgage Corp. of Santa Ana, Calif., has saved $40,000 a month since downsizing onto a client/server system, said Herbert Kummer, the firm's chief information officer.

"Ten thousand [dollars] of that is just photocopying cost reductions," Kummer said. "Now people can look at images of documents on-screen as opposed to handling the paper themselves."

Plaza Home Mortgage used to make 1 million photocopies of the 6,000 loan files it processes each month.

Plaza Home is a beta tester of the NT version. Kummer said thus far he has only tested generic drivers that allow Windows-compatible equipment to be used with ViewStar 3.1. He has been able to integrate high-speed printers and scanners, he said.

ViewStar on NT will ship in October and will provide a gateway between DB/2 and NT at the same time, Wehrle said. The company also will run on the Sequent Corp. multiprocessor server with NT in August. Prices have not been set.

ViewStar's release of Windows NT optical storage services will follow by the end of 1993. ViewStar will complete the port of its core object technology to Windows NT Workflow Servers with client support in 1994.

Router promises to work nonstop

CrossComm builds in redundancy to prevent failure

BY JAYNE WILSON

Managers of Systems Network Architecture (SNA) networks who are worried about the safety of networks running mission-critical data and applications might consider a multiprocessor backbone router from CrossComm Corp.

The ILAN XL80 sports a combined hardware and software architecture that promises "non-stop" networking by providing important redundancy features. The unit has no single point of failure because it combines a parallel routing architecture with protocol independent routing (PIR).

The parallel architecture uses eight multiprotocol routers or modules, which each support up to four LANs. The PIR software automatically reroutes traffic if a path is congested or fails, regardless of protocol, company officials said.

The unit is targeted at large SNA enterprises where routers handle data from many different hosts.

"Traffic coming into the data center used to be connected via traditional SNA. Now much of it is coming from LANs," said Gregory Koss, vice president of product marketing.

Each module has four onboard i960 RISC processors and transfers data at about 30,000 packets per second. A module can be replaced without shutting down the system. New modules will automatically configure when plugged in.

The RISC processors provide the performance to do compute-intensive work such as accounting and inventory applications, as well as rule-based expert systems for troubleshooting networks, Koss said.

The new router is Simple Network Management Protocol manageable or can be managed using IBM's LAN Manager. It is Advanced Peer-to-Peer Networking and Asynchronous Transfer Mode ready.

The ILAN XL80 is priced from about $20,000 depending on configuration. Upgrades to Asynchronous Transfer Mode capability will be priced at $1,500 per router module.

CrossComm of Marlboro, Mass., can be reached at (800) 388-1200.

Oracle and U.S. West eye multimedia

BY SHAWN WILLETT

The first tangible effects of the agreement by U.S. West and Oracle Corp. to develop a multimedia information server for an "information highway" will come next year with the ability to easily send multimedia messages across wide areas.

The technology is aimed at giving customers a mailbox to store the messages, which can contain text, audio, and video.

That capability, however, will not be available until 1994, and even then only in a few cities in the western part of the United States, officials said.

Under terms of the pact, Oracle will design an information server for U.S. West, the regional phone company for a number of Western states. The server will be a repository for multimedia messages as well as consumer services, such as movies on demand.

A broadband telephone backbone network, and individual corporate broadband connections into it, will be necessary to take advantage of the services that run on the information server, according to Tim Negris, Oracle's senior director of server product marketing.

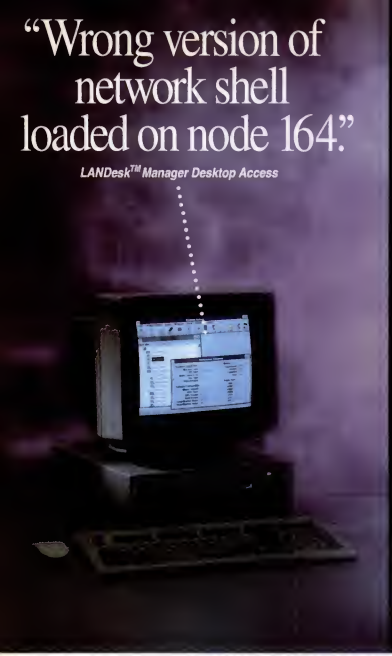
Broadband connections are needed because multimedia files are large. A movie, for example, is about 1 gigabyte.

The companies were vague about plans for developing another crucial piece of technology: the interfaces between the multimedia services and existing mail and database applications.

U.S. West will make application programming interfaces (APIs) available to software firms and smaller third parties, Negris said. In turn, these companies will design their own interfaces or gateways to the multimedia messaging service.

However, officials confirmed that no APIs are close to being published, and no software companies have committed to building interfaces to the services.

Oracle's Abrahamson unveils plans for a multimedia information server.



Intel LANDesk™ Manager software so smart.

Introducing centralized control for networked PCs.

Communication is essential for a good relationship. Especially when you're dealing with a network.

Well, now your network will tell you everything you've ever wanted to know, from packet traffic to virus protection updates, with Intel's new LANDesk™ Manager software. It gives you absolute control of your networked PCs and servers—from your own desktop.

LANDesk Manager is a Windows®-based command center. It provides a central point of control from which to launch applications, monitor traffic, generate reports, and make network and node adjustments.

It includes Desktop Access, a utility for remote control and diagnosis of any PC or server. You can run diagnostics, make configuration changes and even reboot as if you were at the workstation.

LANDesk Manager's Application Monitor is a breakthrough tool that has

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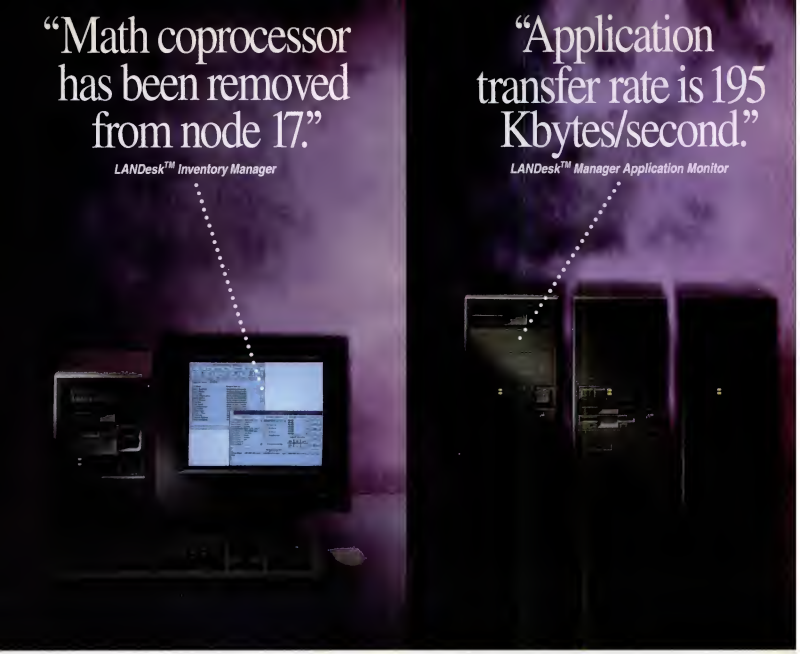

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Open development software spurs X.400, X.500

BY ELIZABETH HEICHLER

The first open development software to comply with the X.400 messaging standard and X.500 directory standard will debut at next month's Electronic Mail Association Expo, in Atlanta.

Observers familiar with the technology expect the ISO Development Environment (ISODE) Consortium's Release 1 software will form the core of a new generation of commercial messaging and workflow products for enterprise networks.

They point to X.400's multiple protocol support, better migration from X.400 to X.500, and upgraded X.500 database management and directory synchronization of giant enterprise networks.

"Our [X.400] is a protocol-independent implementation into which you can plug X.400, DECnet, or Unix-to-Unix-Copy Protocol," said Steve Kille, ISODE Consortium president. "For example, the gateway is not an add-on but the fundamental way it works." Other vendors implement X.400 and then develop gateways on the side, he said.

The consortium's X.400 will make migration to X.500 easier, because it can use X.500 directories as distribution or routing lists, Kille said. The standard also has sophisticated authorization and monitoring facilities, as well as SNMP management.

The Release 1 software includes a transport module for mapping onto multiple network transport application programming interfaces (APIs), Connection-Oriented Network Service, X.25, and TCP/IP; it also includes a transport bridge to interconnect different transport stacks.

The consortium's X.500 implementation is also drawing interest, because it provides almost all the X.500 functionality with simplified encoding and mapping onto TCP/IP, according to Kille.

The X.500 software, known as Quipu, (the Incan word for the knotted strings used to record information), enhances support for large directories with features such as a Directory System Agent (DSA), sample Directory User Agents (DUAs), and a Lightweight Directory Access Protocol that works with DUAs and can be implemented on small computers such as Macintoshes and PCs.

Observers familiar with Quipu are also enthusiastic about its disk-based database and a database API.

Previously, the database was stored in a text format and read into memory at start-up. Although this works well for small directories with 10,000 or 20,000 entries, a 100,000-address directory would require a lot of memory and make start-up a lengthy process, observers said.

ISODE X.400 will make migration to X.500 easier.

To address this, the consortium built a disk-based database using B-tree indexing technology. Using an API that separates the database from the DSA, different databases can be integrated with the DSA. Existing corporate directory data can then be accessed through X.500.

Quipu also provides access control and other management features missing from the 1988 edition of the X.500 standard.

The commercial release can use SNMP for DSA monitoring. The consortium will provide sample DUAs, but Kille said the group plans to let developers add user interfaces and applications.

ISODE Release 1 is available free to consortium members and academic groups. Nonmembers can have a 30-day evaluation copy for a nominal fee.

The ISODE Consortium is based in London. ISODE can be reached in Austin, Texas, at (512) 338-3340.

— Elizabeth Heichler is the European correspondent for IDG News Service.

HP upgrades power of OpenView for Windows

Management features improved; application builder to be added

BY TORSTEN BUSSE

Hewlett-Packard Co. is upgrading its OpenView for Windows network management package, with an eye toward providing the performance of its more mature Unix-based version.

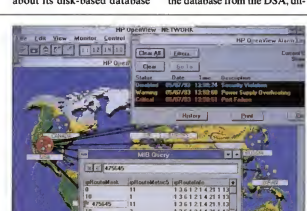
OpenView for Windows, Version 7.0, will ship in June and add improved management, an application builder, and automatic discovery and mapping of remote nodes.

The new SNMP alarm manager will filter and sort events and color-code device icons on the network map. Built around Borland International Inc.'s Paradox database, it works with popular electronic mail and paging systems for speedy event notification.

The SNMP services have been enhanced to simultaneously support TCP/IP and Internetwork Packet Exchange (IPX) protocols, allowing for management of Novell Inc.'s NetWare and TCP/IP networks from the same platform, said Bill Leavy, HP marketing manager.

Version 7.0 will also sport an SNMP Manager to perform Management Information Base (MIB) polling, browsing and graphing. The product will ship with a library of precompiled MIBs and users will be able to compile additional MIBs.

In August, Release 7.1 will be shipped with IPX and TCP/IP auto-discovery and layout features, which will automatically discover all IP- and IPX-based devices and create a hierarchical map of the network. These additions will allow third-party vendors to add devices based on SNMP to the OpenView map.



HP's OpenView for Windows automatically prioritizes event alarms and lets users click on the map to get SNMP queries.

Also in August, HP will offer the $1,000 Application Builder, which is based on Microsoft Corp.'s Visual Basic graphical programming environment. It allows developers to build specialized management applications for use under OpenView.

HP will continue to increase compatibility between the Unix and Windows versions of OpenView, allowing users to switch between products, Leavy said.

"Our goal is to offer the same graphical user interface [between Unix and Windows] and allow for common database and data processing," Leavy said.

OpenView for Windows 7.0 and 7.1 will be priced at $595 per console. The developers' kit for Version 7.0 is priced at $2,500 and is available now. The Version 7.1 SDK ships in August at no added cost.

HP is located in Palo Alto, Calif., and can be reached at (800) 554-1305.

Simplify folds paper into your E-mail system

BY ED SCANNELL

Simplify Development Corp. next month will deliver network software that lets users electronically distribute paper documents through existing electronic mail applications.

Simplify's MailRoom for Windows combines paper, fax, electronic data, and images into a "bundle," which can be sent by E-mail directly to and from user desktops.

MailRoom for Windows works with Simplify's ShareScan software, also due in June, which turns a scanner into a network device.

"We think [MailRoom] can replace piles of curly fax sheets that arrive somewhere down the hall and interoffice mail," said Edward Schmid, Simplify CEO. Instead of jumping from one application to another to read E-mail attachments, users can browse information with MailRoom, which works in local and wide area networks, he added.

MailRoom for Windows is compatible with Lotus cc:Mail and Da Vinci eMail and works with Windows 3.1 and NetWare 3.11.

The total cost per user is expected to be less than $200, a company representative said.

Available June 1, MailRoom will cost $995 for a 10-user license. ShareScan costs $495 per server.

Simplify, based in Nashua, N.H., can be reached at (603) 881-4450.

WinInstall installs Windows apps from central location

BY TORSTEN BUSSE

Aleph Takoma Systems Inc. is shipping an easy-to-use software distribution system for Windows applications.

WinInstall 3.0 enables network administrators to install, remove, and distribute Windows applications from a central location to each PC on the LAN without dispatching a technician. The package uses three complementary distribution methods.

End-users can run an interactive Windows application that lets them browse a list of applications configured for installation and take actions via the Install or Remove buttons.

Or, a WinInstall/Auto program can be loaded in the end-users' Startup Groups. It runs a configuration check each time Windows is started and automatically installs prepared updates.

Software updates can also be distributed by attaching them to any Windows-based electronic mail message. The software allows administrators to control access to applications, display custom messages, and log activities to a central file.

WinInstall runs on any network operating system that supports Windows 3.1 and costs $495 per server for unlimited users.

Aleph, in Takoma Park, Md., can be reached at (301) 270-4458.

Help desk program attaches system data to help requests

By Torsten Busse

Automated Design Systems Inc. next month will ship a Windows-based help desk tool that makes it easier for managers to get users back on-line.

Net Tools Help+ automatically attaches relevant configuration data to trouble tickets sent by end-users to NetWare LAN administrators.

Attaching important workstation data on software and hardware configuration to requests for help speeds resolution of the problem, ADS officials said.

"LAN administrators will spend less time requesting the necessary information and instead start analyzing and prioritizing a problem as soon as the trouble ticket comes in," said Steven Bachman, ADS president. "And it saves an administrator from visiting the workstation."

End-users have access to the Net Tool Help+ toolbar from their PC over the network. It allows them to fill in a short description of the problem and send the trouble ticket to the LAN administrator.

Windows, DOS, and network configuration files sent with a Net Tools Help+ trouble ticket include memory maps, WIN.INI and SYSTEM.INI files, Windows mode and configuration files, printer and network connections, drive mappings, and AUTOEXEC.BAT and CONFIG.SYS files.

Version 1.0 of Net Tools Help+ features a built-in messaging system that sends the trouble tickets directly to the administrator's console. Add-on modules slated for release later this year will support popular electronic mail standards and applications, including Microsoft Mail, Da Vinci eMail, Powercore International's WinMail, cc:Mail, and Lotus Notes.

Future versions will support Microsoft Corp.'s LAN Manager and Windows for Workgroups, Banyan Systems Inc.'s Vines, and Artisoft Corp.'s LANtastic.

Net Tools Help+ is priced at $195 per server with an unlimited number of users. It includes the Help+ Toolbar and the LAN administrator's console.

ADS, in Atlanta, Ga., can be reached at (404) 394-2552.

IBM offers free betas of OS/2 remote access app

By Jayne Wilson

IBM is offering free to any customer a beta copy of its OS/2 2.x-based Remote LAN Access software for linking remote PCs to the office or to each other.

Code-named Thunderbird, the software-only product lets remote users run unmodified LAN applications and have up to 32 concurrent multiple connections to the LAN server or attached PCs. It runs on OS/2 2.x servers and OS/2 2.x and Windows 3.1 clients.

Remote LAN Access can also remotely manage PCs, and IBM will bundle features to let administrators remotely manage multiple department LANs linked together.

Recent enhancements to the Thunderbird beta include easier direct access to numbers in the product's phone directory. Also, remote LAN access and new security features allow administrators to limit access to specific machines and set access privilege levels.

In response to early disclosures on Thunderbird, more than 1,500 customers have signed up for the beta program.

"The timing on general availability depends on customer feedback," said Bob Spikelmier, IBM's program manager of LAN systems marketing. "Our paradigm is letting our customers tell us when we are ready to ship."

Thunderbird supports Token Ring, Ethernet, ISDN, X.25 (modem), NetBIOS, Netbeui, IPX, TCP/IP, and SNA. It works with IBM's LAN Server, Microsoft Corp.'s LAN Manager, Novell Inc.'s NetWare Server, and Artisoft Corp.'s LANtastic.

In addition to the free on-line Thunderbird beta, diskettes and hard copy documentation versions are available for $80 in the United States and $100 in Canada.

Customers can contact IBM marketing representatives in the United States at (800) 426-3040 and in Canada at (800) 561-5293.

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Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making **switching so seamless, end-users won't even notice.**

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.† Capabilities this advanced make a world of difference—in any environment.

HEWLETT PACKARD

PhoneClient lets you dial up Notes

Voice data can be accessed or retrieved via phone

BY DOUG BARNEY

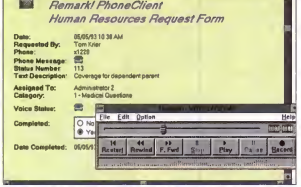
Most network vendors say access to information from the road is child's play: Just plug your laptop into a phone jack, dial up, and compute away.

It's not that simple. Most users don't lug around a PC, and laptop modems aren't accepted by all telephones.

Simpact Associates Inc. offers a solution with Remark PhoneClient, a Touch-Tone phone that doubles as a keypad, allowing users to tap into Lotus Development Corp.'s Notes.

The software allows users to call into a Remark voice and telephony server, which acts as a bridge to Notes. Through this server, users can record and play back voice information from within a Notes database. Remark also lets non-Notes users tie into the system.

PhoneClient lets users create new documents, embed voice information in the document, and select options and categories. These phone-inspired documents, more often voice than text, are available to other Notes clients. A future version will use voice synthesis to read documents over the telephone.



Simpact's Remark PhoneClient enables remote or mobile users without PCs to share information with desktop Notes users.

For best use of the technology, the company recommends that corporate Notes developers store information in voice form. Although this may entail writing custom applications to suit roadweary employees, it ensures interaction between remote users and those in the office.

Simpact later this year plans to release turnkey applications and development tools for building phone-based applications. The company is also working on voice recognition so users can create a text document simply by speaking into the phone.

Remark PhoneClient for Lotus Notes is available now for $2,850, which includes a single-client license and the Remark voice and telephony server software.

Simpact, in San Diego, can be reached at (619) 565-8196.

Harvest reads fax forms into hosts

Graphical tools simplify setup

BY VANCE MCCARTHY

IS managers plagued by how best to integrate faxed business forms into their databases may find relief in an integrated offering from Harvest Software Inc.

The company's suite of forms data interchange software products, called Harvest Master, use intelligent optical character recognition to extract data from typical forms, such as purchase orders and loan applications.

Once captured, the software also enters the data directly into IBM mainframe transaction processing systems, company officials said.

Because no programming is involved, no modification to the host application is required, a company representative said. Beta testers can set up and test new applications in less than a day.

Harvest Master includes graphical, object-oriented development tools as well as a set of facilities for executing and managing fax form applications.

The tools, known collectively as Harvest Builder, are used to build applications that send or receive faxes, read forms, map the resulting data directly into host systems, and fax back responses. Users simply select tools, graphically define data fields, and link them visually to show how the data flows.

The facilities, called Harvest Operator, enable the automatic execution of transactions through a live host session. If a transaction must be approved, an image of the fax appears onscreen with the relevant data highlighted.

Each Harvest Operator module can receive and send from up to four fax lines simultaneously. Larger volumes can be off-loaded to network servers running additional Harvest Operator modules.

The Harvest Master package, including Harvest Builder and Harvest Operator modules and licenses, is priced at $35,000. Additional modules are $15,000.

Harvest Software, in Sunnyvale, Calif., can be reached at (408) 245-2600.

Eicon can put PC users in touch with SNA host

Windows, DOS, OS/2 supported

BY JAYNE WILSON

Eicon Technology Corp. is shipping a pair of LAN gateways that let Windows, DOS, and OS/2 PC users access applications and mail resources from IBM midrange and mainframe hosts.

The Systems Network Architecture (SNA) and Open Systems Interconnection (OSI) LAN Gateways for Unix reside on a server running NetWare, Windows, DOS, or OS/2 and provide a link to SNA hosts over X.25 and Synchronous Data Link Control (SDLC).

The products, which include an Eicon hardware card and a software component, enable the servers to appear as cluster controllers. All the SNA and OSI protocols reside on the card, which supports the protocols to the host at speeds as high as 384Kb per second. The software is loaded onto the server where it provides transport services for PCs on the LAN.

The Eicon card is installed into the OS/2 or DOS server and in a NetWare file server, where the card acts as a NetWare Loadable Module. Users can emulate as many as 32 cluster controllers on each card and attach as many as four cards on each server, which supports as many as 254 concurrent users.

"[Because the SNA and OSI protocols are software], the card supports a wide range of datalinks, and as other protocols become available, users can download them onto the same card," said Tony Kourlas, Eicon product manager.

Terminal emulation software is required for each PC on the LAN and is available separately. The gateway products support 3270, 5250, and APPC/LU 6.2 emulation applications.

The SNA LAN Gateway for Unix provides connections over SDLC and X.25 to mainframe and midrange applications. Via X.25, the OSI LAN Gateway for Unix connects PCs on the LAN to E-mail packages.

Prices for both gateways start at $795 for the DOS server and $1,195 for the NetWare server.

Eicon, in Montreal, can be reached at (514) 631-2592.

VMXmail puts voice mail in your E-mail In box

BY CHERYL GERBER

If VMX Inc. has anything to say about it, voice mail will come to a desktop near you.

The voice processing firm will release this week at spring Comdex VMXmail, a product that integrates voice messages with Microsoft Mail and Lotus Development Corp.'s ccMail.

"This is the first step toward a unified mailbox of voice, E-mail, and fax messaging on the desktop," said Dustin Sykes, a telephony consultant with Vanguard Communications Corp., in Morris Plains, N.J.

Because VMX uses the Interactive Multimedia Association's standard telephony format, Sykes said VMX is on the road to sending voice mail over a LAN and imbedding sound in a document so users can choose to play it over the phone or speakers on a PC.

The Windows-based client/server product runs on Novell Inc.'s NetWare or Microsoft Corp.'s LAN Manager. It uses a multiline voice board on a dedicated server for shared use across a network.

The client software works with E-mail to display received voice and E-mail messages, as well as the message's sender, length, and time of arrival.

VMXmail uses the Vendor Independent Messaging or Microsoft Mail application programming interface as the E-mail backbone, storing or forwarding voice messages as attachments, said Henry Hyde Thomson, president of VMX client/server software division.

VMXmail server software is available now for $1,500; the client software is $35 per user. It requires a voice processing card. The VMX voice processing SDK ships in the third quarter.

VMX, in San Jose, Calif., is at (408) 441-1166, Ext. 4366.

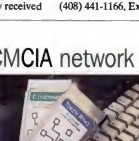
Product Spotlight

Thomas-Conrad to ship PCMCIA network cards

Thomas-Conrad Corp. is expected to ship this week its PCMCIA Type II Token Ring and Ethernet adapter cards. The T-C Cards promise speeds equal to full-size network interfaces — up to 16Mb per second — and are configured with software drivers for DOS-based NetWare, LAN Manager, and LAN Server. The software also provides automatic installation of NetWare Lite and LAN Manager.

The $779 TC4041-STP card is for Token Ring networks. The $359 TC5041-T and $375 TC5041-2 are for Ethernet 10Base-T and 10Base-2 networks, respectively. All carry a five-year warranty.

Thomas-Conrad can be reached at (800) 332-8683.



LAN Talk / Paul Merenbloom

NetWare 4.0 adds its own momentum to the CD revolution

There's a lot to like in NetWare 4.0, but one of the things I like best is that it comes on CD-ROM. This is the media distribution of choice for the future, so if your network isn't CD-ready, it might be time to get started.

Why bother with CD-ROM, you ask? Lots of vendors, including Microsoft, are offering financial incentives for buying programs and documentation on CD media. So not only do you gain having documentation available on-line from any PC, but you save some money in the deal. And you can save space and a few trees by buying fewer paper copies of the manuals.

Once you are CD ready, a wealth of information is available on the small, inexpensive disks.

Although magnetic media is still around (and will be for a long time) NetWare is now lending support to the CD revolution forcing many of us to implement CD ROMs. So, what do you do?

Installing CD-ROMs seems pretty simple — but appearances are often deceiving. Support for CD media under NetWare is not new, but it is still an evolving technology.

So, for starters I'd read up on a couple of areas. First, look into the ASPI driver specification. Second, study SCSI addressing and implementations. And, most important, evaluate the various approaches to providing networked CD support.

ASPI, the Adaptec SCSI Programming Interface, was developed by Adaptec Inc. ASPI is a set of specifications that have been widely adopted for communicating with SCSI devices — including CDs.

The ASPI drivers enable the CD device (or other SCSI unit) to be seen by DOS, Windows, OS/2, NetWare, etc. and can be implemented in a number of ways, including through drivers loaded into the PC's CONFIG.SYS and through NetWare Loadable Modules (NLMs).

ASPI has become a de facto standard in SCSI communications and is supported by most of the SCSI hardware manufacturers and software developers.

For those interested, Adaptec has published a white paper on the subject that outlines the whats, whys, and whos of ASPI in easy-to-understand language. You will also find loads of stuff on the subject in technical journals such as the *Microsoft Journal*.

Now that the drivers are loaded (and CD equipment is installed) you should be able to read from the drive. Under DOS this is simple — point and shoot. The rules change a bit under NetWare.

Under NetWare there are two general alternatives. You can load the CD Server as a "peer" device, or you can load the disks as NetWare volumes. Both approaches work well and have their pros and cons.

Products such as Micro Design International's SCSI Express, Meridian Software's Meridian Net, and OnLine System's Optinet enable you to mount CDs as NetWare volumes. This is done via NLMs and places the burden of CD services on the NetWare file server.

The other approach, also supported by several of these vendors, is to load a dedicated PC as the "server" and have it used over the network in a peer-to-peer fashion.

Both approaches are valid, and we'll look more into the details of each during the next few weeks. One quick rule of thumb, though, is that if you are planning to mount the CDs as NetWare volumes, plan to buy a lot of extra RAM for the file server. This additional memory will support the NLMs and will be used to cache the CDs (important because CD media is very slow compared to magnetic media).

CD technology is here to stay, so it's time to get on board. Having fought with implementing this over the past month or so, I can honestly say that the technology has a long way to go — but the benefits to you and your organization are definitely worth the work.

Paul Merenbloom is manager of information technology at Otsuka America Pharmaceuticals, in Rockville, Md. Send comments to him via CompuServe at 70743,3524 or via MCI Mail at Paul Merenbloom.

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TO THE EDITOR

DOS 6.0 safety tips

I know I can always count on *InfoWorld* to give me intelligent advice, especially when it comes to loaded guns. (See Second Look, April 26, page 1.) I never would have thought of not pointing a gun to my head if I hadn't read it in *InfoWorld*. Thanks. Got any advice on what I should do with the knives (carving or butter) in my kitchen?

You know, I've also had my share of problems with DOS 6.0's installation: Twice I've gotten paper cuts while flipping through the manual. I think there's a story in there somewhere. Perhaps this paper-cut thing deserves a Third Look. I'd get Brad Chase on the phone.

Come on, guys, besides the sensational metaphor, do you really believe Kevin Strehlo's Second Look at DOS 6.0 provided your readers with anything insightful or even remotely worthwhile? The only loaded gun out there is the one *InfoWorld* is handing readers by not reporting on the inherent benefits of working with operating systems that have integrated data compression and memory management.

Best of luck to those who choose not to upgrade to DOS 6.0, because you'll be playing catch-up later in life. This operating system and those of the future will compress data and manage memory, and that is what *InfoWorld* should be preparing its readers for.

John B. Anthony
Consultant
JBA Consultants
Seattle

Wounded messenger

Stewart Alsop's column of May 10 hit the nail on the head. Microsoft is trying very, very hard to dominate both the applications and operating systems markets. To earn this position, it has produced some excellent products. I don't think most people begrudge the company the market share it has gained in this way. But a naked money-grab like DOS 6.0 combined with a "shoot the messenger" response when problems surface earns only contempt and fear.

What is to happen to this industry when someone of the stature of Bill Gates feels his time is better spent on the phone berating *InfoWorld* than addressing his users' complaints? Is this the kind of attitude we can accept from an "industry leader"? If Microsoft, of all companies, apparently has trouble with a new DOS version and then takes an "it's your fault" attitude, why would I trust my company's most critical applications to its unproven Windows NT?

Gregory Feeler
Information Systems Manager
Employers Resource Inc.
Boise, Idaho

Our jobs

I would like to commend Stewart Alsop for his courage in reporting recent events between *InfoWorld* and Microsoft Corp. With the implied threats from Mr. Gates, he took a considerable risk in reporting the truth. I trust *InfoWorld* will continue to report the news as its reporters see it, not in accordance with the wishes or benefit of any company. Thanks for showing a stiff spinal column in the face of such a violent attack by an industry leader.

Richard W. Blalock
Manager of Computer Resources
SWA
Mount Pleasant, S.C.

Pointing fingers

MS-DOS General Manager Brad Chase implies that the installation of MS-DOS 6.0 was flawed by mistakes made by Kevin Strehlo. (See To the Editor, May 10, page 60.) The notion that the installation can be screwed up by users is typical of many companies in our industry, which seems to design products for "nerds only."

Rather than viewing the installation problems of DOS 6.0 as a problem to be defended, Microsoft could make this a competitive advantage. It could choose to design software that can be used and installed by my mother-in-law (forgive me).

If Japanese automakers had entered the U.S. auto market in the 1960s with the same disregard for the user, we would all still be driving Chevys.

Larry Whalley
Principal
Rhinoceros Consulting
San Francisco

Tech tests

I am tired of seeing Brad Chase's name in the "To the Editor" section of your magazine. Mr. Chase suffers from a terrible case of hubris. The whole point of an upgrade is not whether *InfoWorld* technicians can do it correctly, but whether my 9-year-old daughter can do it correctly. I am in charge of about 160 PCs around the country, and most of my end-users know less about their PCs than my daughter does. I also believe that, as sophisticated as we like to think we are in my shop, your people probably know more about the inside of a PC than mine do. It is totally semantics to the end-user whether *InfoWorld* made a mistake or not. The upgrade should not let you make a mistake.

Brian Garr
Bethesda, Md.

Temperance

Although Ed Foster's weekly commentaries are usually right on the mark, his editorial, "We should let Microsoft be Microsoft, even it it kills itself" seems intended to trigger a hysterical stampede of crazed users. (See May 3, page 57.) Any tool in the wrong hands is dangerous. We've been able to delete COMMAND.COM since DOS 1.0. Is that "dangerous"? An uneducated user can reformat a hard drive. Is that "dangerous"?

With any advancement in technology, there will always be hazards. The computer industry media's role should be to educate the consumer about its pitfalls. *InfoWorld* is at its best when you present us with facts and objective analysis. The educated consumer is the best check against any company's ineptitude, whether it is Microsoft or any of its competitors.

Stephen C. Smith
Wordsmith Resources
Santa Ana, Calif.

Billings replies

In his latest column on my patent infringement suit against Novell Inc., Bob Metcalfe declared my patent to be grossly invalid. (See April 26, page 52.) After claiming to have a truckload of "prior art," he suggests that someone come up with $1,000 to ask the Patent Office to review the material in an attempt to have the patent invalidated.

I have enclosed a check for $1,000. Take your best shot!

When I unveiled my invention at NCC in 1982, I believe no one else had the technology, although I had been working on it since 1976. I believe the patent is valid. The fact that, as Metcalfe admits, Novell and "almost every other computing company" infringe the patent does not diminish the validity of my patent. In fact, the popularity of the technology only underscores the importance of the invention. One by one, almost all of the predecessor technologies have given way to FSD (my name for the technology). It is an idea that really works. I believe the inventor of an important, time-tested technology deserves to collect royalties from everyone who benefits. That was the very idea that inspired Congress to establish the patent laws — to motivate the development of new ideas.

When the current lawsuit finally goes to trial, I believe the jury will find that NetWare infringes my patent, and in fact, that the company is guilty of copying. According to public documents on file with the SEC, the Novell Superset team has received hundreds of millions of dollars for selling ideas to Novell. If they have created their ideas from me, then shouldn't I receive a royalty?

Dr. Roger Billings
President
International Academy of Science
Independence, Mo.

It is my expert opinion that the Billings patent is invalid. Many other people developed the idea before Billings claimed them. The purpose of our patent system is to encourage people who know how to invent, not those who know how to patent. Thank you, Dr. Billings, for your $1,000 check, which I plan to use in due course to file for a re-examination of your patent. Before that, however, I trust that your patent, based on hundreds of items of prior art, will be thrown out summarily by the judge in your lawsuit against Novell and the Bank of America. — Bob Metcalfe

Please write to Letters to the Editor, InfoWorld, 155 Bovet Road, Suite 800, San Mateo, CA 94402; (MCI Mail: 259-4127; CompuServe: 73267-1537; Internet: Letters@InfoWorld.com). Letters may also be faxed to InfoWorld *at (415) 358-1269. Please include your name, address, and daytime telephone number. Letters selected for publication will be edited for length and clarity.*

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From the Editor / Ed Foster

Our Corporate Support Alliance is your chance to be nice

OK, kids, here's your chance to say something nice for a change. And it may be the only one you'll get, so don't let it pass you by.

From the response I've gotten to Frank Hainze's letter so far, I am comfortable that we're on the right track. Most agree that we still need the gripe line because it really is helping *InfoWorld* identify a variety of problems our readers face. But on the support issue, we need something more.

What we lack is a way of telling how good a particular vendor's support may be — the gripe line only gives us an idea of how bad the really bad ones are. To really make an impact in this support mess, *InfoWorld* needs a fair method to grade the vendors from the top to the bottom.

Is a vendor's support service poor, mediocre, solidly competent, or exceptional? Are the pay-for-support programs worth the money? How do the vendor-sponsored on-line forums compare? And are the companies we've identified as having support problems getting any better?

Those are the kinds of questions we need to be able to answer. And I think I know how we might be able to do it.

A few weeks ago I proposed what I called the *InfoWorld* Corporate Support Alliance, a program in which we would enlist *InfoWorld* readers to regularly report on the quality of support they receive from all their vendors. Quite a number of folks said it sounded like it might be a good idea, but they were a little unclear on the details — hardly surprising, since the idea was still pretty vague in my own head at the time.

From talking to some of those who showed interest, however, it's become a lot clearer to me how it ought to work. For one thing, I'm convinced it will have to be E-mail based. Voice mail is great for the gripe line, but this kind of program will be unmanageable at both ends if we don't use technology to help us.

The idea is to keep it simple and quick so we can have lots of people participating on a regular basis. The way to do that is to devise a simple electronic form that allows each Alliance participant to list the companies that their organization contacted for support during the reporting period. We will have a grading system, so you just fill in a number score for the quality of service you received from each support program and E-mail it in.

InfoWorld would compile the results and E-mail them to each participant on a regular basis — as frequently as once a month if we have the participation to make that worthwhile. And, of course, we would use the numbers in the pages of *InfoWorld* itself to grade support in our reviews and product comparisons. I also envision many more support-oriented feature stories to tell all of our readers what kind of support they can expect from different companies.

Who could participate? Again, to keep it simple, I think we'll just say that all qualified *InfoWorld* readers are eligible. I know this means some faithful readers who don't happen to get an issue in their own name won't be able to join, and that's unfortunate. But by limiting it to certified readers, we'll know and you'll know that our results are not being skewed by the experiences of users who may not represent the type of support needs you have.

The big question is whether or not we can get enough people to join. No matter how simple we keep it, it is still going to require a lot of you to regularly take a few minutes out of your very busy schedules. That's akin to holding a general election every month or so and counting on a heavy voter turnout each time. It may be a bit too much to expect, and I won't be shocked if turnout does not meet expectations.

So let's try an experiment to find out. We're going to set up an "ally" E-mail box on our Internet server specifically for this. If you're interested in helping the *InfoWorld* Corporate Support Alliance, send me a message at ally@infoworld.com. (As explained on page 66, you can do this from a variety of E-mail services such as MCI or CompuServe, as well as directly on the Internet.)

And, just to add a little drama, include in your message the one computer vendor — hardware, software, and/or networking — that you feel consistently gives you the best service and support. I'll enjoy having something nice to say about somebody for a change.

Ed Foster is editor of InfoWorld. *He gets electronic mail at MCI account 584-3453. Or, you can call (800) 227-8365, Ext. 710, to report a gripe you have with a vendor.*

Peer to Peer / Michael H. Prager

Eight reasons why OS/2 whips Windows in the operating system arena

Michael H. Prager is a research biologist at a large noncommercial laboratory. He can be reached via his CompuServe mailbox at 72050,3220 or on the Internet at 72050.3220@compuserve.com.

Should a DOS (or DOS with Windows) user switch to OS/2? I did, and I'll never go back.

In my work, I use a wide variety of software, including WordPerfect, MathCad, TK Solver, Quattro Pro (DOS), 1-2-3 for OS/2, several statistical packages, scientific graphics programs, symbolic math programs, and two Fortran compilers. I run numerically intensive programs on a PC and on a Unix workstation (via RS-232). At home, I log on to CompuServe and several BBSes. This is all done under OS/2.

For me, multitasking on a PC began with Desqview. I liked it better than simple DOS, but it crashed often, so I moved on to VM/386. VM/386 was stable but provided only full-screen sessions, and I missed having windows. So in time, I bought a copy of Windows 3.0.

I liked Windows 3.0, but that crashed a lot, too, even after days of tinkering with PIFs and .INI files and calling Microsoft. Version 3.1 was only slightly better. (When I reviewed my activity logs for last year, I was amazed to see how much time I had spent getting Windows to run my software.)

Finally, I bought a copy of OS/2 2.0. I did have some difficulties, but they were solved by the IBM Help Line and users on the CompuServe OS/2 Forums. As time passed, I really began to appreciate this new operating system.

OS/2 2.0 gives me eight advantages over Windows 3.1. I won't speculate on what future versions of each operating system may bring.

- Once set up, OS/2 crashed far less often than Windows. What a relief to get my work done without rebooting several times a day!
- OS/2 transfers files in the background at V.32bis. I could never get Windows to reliably transfer files in the background while I worked in the foreground. A disk access would kill the transfer and often hang the system. Under OS/2, transfers cause little or no degradation in foreground performance and don't falter even during heavy disk access, graphics rewrites, or intense numerical calculations.
- OS/2 saves me time. It formats diskettes painlessly in the background. OS/2 can simultaneously read a diskette and write to the hard disk. And OS/2 DISKCOPY reads the whole first disk before writing the second, eliminating diskette shuffling. File access under OS/2 is noticeably faster than under DOS or Windows. Because of this, OS/2 runs disk-intensive DOS applications faster than native DOS runs them. It runs native OS/2 applications very quickly indeed.
- No more memory managers. On my clone, a DOS session under OS/2 has 622KB of memory free, with no special setup. The DOS memory manager, disk cache program, and print spooler are built in to OS/2, they perform well, and they don't eat up the DOS 640KB.
- The OS/2 desktop uses the 256 colors available from my Super VGA card. Most Windows drivers use only 20 colors. Wouldn't it be nice to see the other 236 colors you paid for? By the way, the screen fonts are clearer, and the graphical interface is more consistent.
- The OS/2 print spooler works well, handles output from all DOS and Windows applications, and speeds printing.
- SCSI support is built into OS/2, and many drivers are available. For me, it was plug and play on a clone with SCSI tape drive, CD-ROM, and disk.
- OS/2 costs less than DOS, Windows, a replacement print spooler, and replacement communications drivers. Heck, it costs less than just DOS and Windows.

Of course, OS/2 is not perfect. But for me, it's a lot better than the alternatives. Some would tell you to wait for NT, but why wait? For less than $100, you can have OS/2 now and enjoy these eight advantages and many more. I know that when NT is in its second or third revision, I'll probably evaluate it. But right now, I have reliable multitasking on my PC. Do you?

OS/2 saves me time. It formats disks painlessly in the background and can simultaneously read a diskette and write to

"Peer to Peer" gives readers a forum for discussing computing and management issues. Send submissions to Rachel Parker, opinions editor (MCI Mail 340-4371). Submissions can also be faxed to (415) 358-1269.

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From the Ether / Bob Metcalfe

DEC launches NT Alpha PC, but watch VMS

My college sweetheart was a PDP-6. That was 25 years ago, and ever since I've been partial to computers from Digital Equipment Corp. I later became a DEC customer, using PDP-8s, 10s, 20s, 11s, and VAXes over the years. I count myself among the old-time DEC loyalists; we know where DEC's Parker Street entrance is, and we will never get used to calling it Digital.

Unfortunately, during the 1980s, DEC stretched and broke the limits of customer loyalty. So, after suffering major financial setbacks and the loss of its beloved founder (my hero Ken Olsen) DEC, like IBM, has a new CEO (my hero Robert Palmer). This CEO is figuring out a strategy for DEC to regain its former glory. However, DEC's strategy for the 1990s, frankly, hasn't gelled (or the company is keeping it a secret).

I asked an old friend, who is leaving DEC's executive ranks but is still loyal, to breakfast at the Concord Inn, near DEC's old Maynard, Mass., headquarters. I sketched a strategy matrix on a napkin and asked my friend to fill it in.

A strategic matrix for DEC

Processor				
VAX	Intel	Alpha		
Yes	No	Yes	VMS	OS
Yes	Yes	Yes	Unix	
No	Yes	No	DOS	
No	Yes	Yes	NT	

I am troubled by the number of squares with Yes in them. DEC is a big company, now the third largest computer company behind IBM and Fujitsu. But this is a world in which even IBM finds itself having to focus.

The strategy matrix shows that DEC is still regrouping, buffeted by trends in the industry: high-margin mainframes and minicomputers giving way to workstations and PCs; the convergence of workstations and PCs; ultrafast RISC CMOS microprocessors, now at 64-bit; from proprietary to open systems; and the growth of PC client/server platforms for mission-critical applications.

DEC will phase out its VAX computers over the next 10 years and will offer Intel computers to those who insist. But if DEC is to regain its glory as a top computer company, it will have to be with its vaunted Alpha chip, the world's fastest microprocessor.

Of course the Alpha will need more than speed to beat Pentium, among others. It will need alternate sources. It will need volume to be cheap, and it will have to be cheap to get volume. DEC, price Alpha aggressively, especially in your new Alpha PCs this week.

But which operating system should Alpha run? VMS drove DEC's expansion into commercial enterprise computing markets through the 1980s. I believe — and many would agree — that VMS enterprise networking, and especially clustering, is still way out front.

DEC, don't dump VMS for Windows NT.

Despite this, VMS, like IBM's MVS, is generally counted out, and all too often I hear laughter at DEC's calling their latest version Open VMS. I think VAX/VMS systems are going the way of PDP-11s, but Alpha/VMS is going to be a pleasant surprise. DEC, don't dump VMS for NT.

Unix was developed for DEC machines 24 years ago, and if it's an open system you want (to quote an old DEC slogan), Digital has it now. I know the major contestants in the OS wars are now 32-bit, but it can't hurt that DEC's OSF/1 Unix, like its Alpha chip, is already 64-bit. And if it's open you want, think about this: Pentium and NT are available only from you know who, while Alpha and Unix are multisourced. DEC, don't drop Unix for NT.

NT, otherwise known as Microsoft Windows New Technology, is due for announcement this week along with the DEC NT Alpha PC. The architect of NT at Microsoft came from DEC, where he led the development of VMS. So it seems natural that DEC would migrate its installed base from VAX/VMS minicomputers to Alpha NT PCs.

Microsoft Windows NT is an uncertain foray into enterprise computing by, yes, the dominant desktop player. VMS already has everything that NT promises. DEC, offer NT for sure, but don't get bullied into making it your primary offering. And keep in mind what happened to the last major computer company that partnered with Microsoft on an enterprise operating system.

Again, I say focus on Alpha/VMS.

Bob Metcalfe is publisher of InfoWorld. *He invented Ethernet at Xerox PARC in 1973 and founded 3Com Corp. He receives E-mail via the Internet as bob_metcalfe @infoworld.com or at 524-1127 on MCI Mail.*

How to contact InfoWorld

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AppleLink: Some of our editorial staff have personal accounts on AppleLink, including Stewart Alsop (ALSOP), Anne Kaliczak (KALICZAK.A), Bob Kayne (KAYNE.B), Kristen Kuetter (KKUETER), Lia Lorenzano (LIA.L), and Tom Quinlan (QUINLAN.T).

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The future of LANs

Do LAN managers see Asynchronous Transfer Mode technology in their networking future?

BY BOB METCALFE

Last Saturday was the 20th anniversary of Ethernet, invented May 22, 1973, at the Xerox Palo Alto Research Center. This means that local area networks have a past. Do they have a future? Say, another 20 years?

Keep in mind that I was the guy who declared 1982 The Year of the LAN. And then again in 1983, 1984, and 1985, until it became an old joke. I still insist I was right, five years in a row.

Which brings me to my first insight on the future of LANs: Things take time. But you knew that.

Rather than trust myself to project current LAN trends or to anticipate a paradigm shift or two, I started in January to interview experts on the subject. What will LANs look like in the year 2013, I asked? After more than 35 hour-long interviews with various industry members, I have an answer: Asynchronous Transfer Mode.

ATM is a digital multiplexing and switching technology developed and standardized by the world's telephone companies to integrate the transmission of voice, video, and data communications.

I have found an amazing consensus among both telephone industry and computer networking experts that ATM is the future of LANs.

Of the few disagreements I have encountered, most are about *when* ATM will unify the world's information infrastructures.

Only the LAN and telecommunications managers of the world can answer this question. I don't mean to rush you, but you have yet to decide what your enterprise needs will be in 2013.

INFRASTRUCTURE. LANs are the focus of this article, but to guard against any hardening of our categories, it is necessary to take a step back and consider all information networking.

Thanks to history, our world has three separate information infrastructures: telephones for voice, televisions for video, and computer networks for data. These separate voice, video, and data infrastructures are all moving from analog to digital for transmission, multiplexing, and switching.

The telephone infrastructure has been digital internally for a long time. So far, a few external digital service offerings, like T1 (1.544Mb per second [Mbps]), have caught on, but only among higher end corporate customers for private voice and wide area computer networking, much of it among LANs. Right now, however, the telephone companies are attempting to deploy lower end digital services through Integrated Services Digital Network (ISDN).

The television infrastructure has evolved from wireless to cable and is on its way to adopting fiber-optic media, but broadcast remains for the most part an analog technology.

Right now the TV industries and their governments are agonizing about how to digitize TV through what they call high-definition television (HDTV), as if the big problem with TV is its resolution.

In the early 1980s, TV people made lots of promises, peddling so-called broadband data networking for LANs. I expect the current round of TV industry proposals for mass-market data communications, despite their move to digital, will be equally disappointing. The big problem with the TV infrastructure is that it broadcasts one way, and the difficulties of converting to two-way point-to-point are generally underestimated.

HISTORY LESSON. The newest information infrastructure, for carrying data among computers, first took off with the development of packet-switching technology in the 1970s. Packet switching was used to transmit data up to 50Kb per second to connect mainframes and minicomputers over wide area networks around the world. Multimegabit shared-media LAN technology in the 1980s adopted packet switching to connect workstations and personal computers within buildings. Today's computer network frontier lies with the packet-switched Internet, a rapidly growing WAN consisting of thousands of interconnected LANs and computers. The Internet infrastructure is being substantially upgraded by the federal government under the rubric of the National Research and Education Network (NREN).

So, if you're thinking it's about time for the telephone, television, and computer networking infrastructures to be unified under a single digital technology, you have a head start in understanding ATM, the grand unifier.

I suggest you think of ATM as packet switching revamped to incorporate voice and video in computer networks.

The problem with packet switching for computer networking is that it works very well, but only if you are stuck in the ASCII-bound applications of the 1970s, as is today's Internet. If you want to begin to mix interactive voice and video into your computer network transmissions, you are limited by what used to be packet switching's primary strength.

To efficiently transfer millions of bits per second, packets vary in length, tend to be long, and are routed one by one in software. These qualities have advantages, especially over the circuit switching technologies they replaced, but they result in delays that make for poor voice and video communications, especially at billions of bits per second.

ATM overcomes these delay problems by using short, fixed-length packets called cells. End-to-end virtual circuit routes are computed prior to the transmission, allowing data to be transmitted, multiplexed, and switched rapidly by the ATM hardware. Switching, transmission, and routing are currently implemented in software, which has inherent speed limitations.

To be a bit more specific, the ATM standard (if there is one) uses 53-byte cells, with 48 bytes of payload and 5 bytes of header. Headers normally include virtual circuit identifiers used by intercon-

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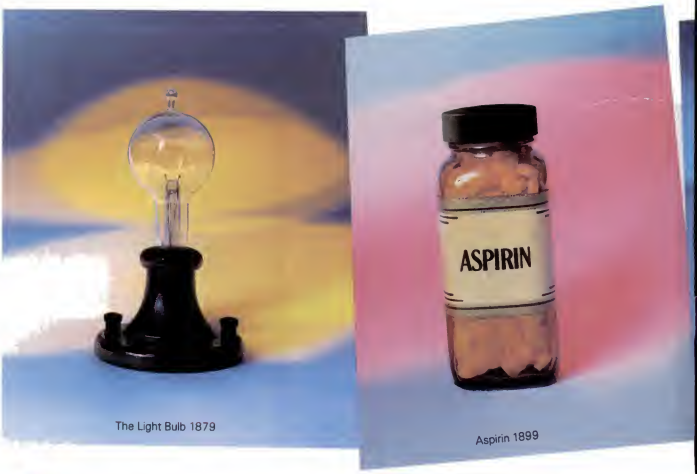

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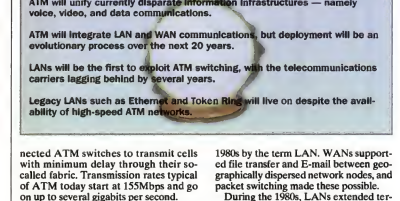


nected ATM switches to transmit cells with minimum delay through their so-called fabric. Transmission rates typical of ATM today start at 155Mbps and go on up to several gigabits per second.

ATM will allow you to mix voice, video, and data transmissions in the same information infrastructure. It is widely expected that ATM will serve as the grand unifier of the major information infrastructures (voice, video, and data) and the grand unifier of the major computer networking modes (WAN, LAN, remote, and mobile). Here endeth the consensus.

Problems with the ATM consensus bud when you ask, *When*? They blossom when you ask, *Why*? ATM is going to take time, like Ethernet took time — 20 years to be exact.

ATM will catch on in LANs before WANs, but not soon. Ethernet and its fellow shared-media LAN technologies, like all technologies in their prime, are not going to help ATM along any. Instead, thanks to the resilience of the legacy LANs (Ethernet, Token-Ring, ARCnet, and LocalTalk), ATM has an ice cube's chance in hell, over the short term. But eventually, ATM will catch on and will be able to coexist with legacy LAN technology.

Ethernet and its fellow shared-media LAN technologies are not going to help ATM along any.

There are at least three good reasons why ATM's eventual grand unification will take all if not more than the next 20 years. First, even before checking with you, dear reader, it's clear that ATM isn't really needed yet. Second, the legacy LANs are not nearly out of steam. And third, ATM is not ready for prime time. But hey, ATM enthusiasts, don't let this get you down. If ATM were easy, everybody would be doing it.

DRIVING FORCES. ATM is designed to answer future corporate needs for greater bandwidth and more efficient data transmission. New business applications will drive corporate demands for ATM services. I know this is where you are more expert and have yet to have your say, but let me just remind fellow ATM enthusiasts that applications drive technology acceptance.

The first important computer networks connected remote terminals to time-shared mainframes and minicomputers. Such terminal applications are still important, even in the Internet, where Unix Telnet terminal emulation connections are still hot stuff. For these applications, you don't even need packet switching.

The creation of the ARPAnet in the 1970s introduced the term WAN, a retronym made necessary during the 1980s by the term LAN. WANs supported file transfer and E-mail between geographically dispersed network nodes, and packet switching made these possible.

During the 1980s, LANs extended terminal and WAN applications to reach increasingly numerous and powerful workstations and personal computers. But they also introduced a whole new set of applications based on shared file and printer services. We are just now witnessing the culmination of these new applications with the widespread deployment of client/server technology, leading to the virtual elimination of mainframes and minicomputers. Packet switching is just fine up to this point.

And now we are contemplating other new applications, which (for want of a better word) we call multimedia. And by multimedia, or interactive digital media, I don't think we mean just what goes on between my CD-ROM and monitor. By multimedia we really mean integrated voice, video, and data networking, the heartland of cell-switching ATM systems. And of all the variations of multimedia, the one that will drive ATM is personal computer videoconferencing — interactive, two-way, real-time, integrated digital voice, video, and data.

But how soon will people be willing to substitute even computer-enhanced videoconferencing for pressing the flesh? And will the earliest PC videoconferencing applications be adequately supported by legacy LANs?

LEGACY TRENDS. Now that the year of the LAN has come and gone, we tend to take LANs for granted. LANs may not always work perfectly, but they do work for the most part, are pretty well standardized, are growing cheaper every day, and, unless you have a hundred diskless Sun workstations accessing servers across a large campus, have capacity to spare. So LANs are not your big problem today, which is a problem for ATM.

Legacy LANs can and are being enhanced and extended in all sorts of ways, even though today they have excess capacity.

Legacy LANs are being transformed from shared to dedicated media using highly buffered and intelligent LAN hubs. So instead of having 100 PCs sharing the 10Mbps of an Ethernet, you can have, when you need it, 100 PCs, each with its own 10Mbps Ethernet.

Another major trend promising to extend the life of the legacy LANs is compression. Remember, AT&T is now selling videophones that run over plain old (analog) telephone service. Thanks to rapidly improving video compression technologies, personal computer videoconferencing is now being demonstrated at trade shows over legacy LANs.

ATM SANDWICH. Another major trend is the independent pursuit of LAN enhancements in the three emerging "regimes" of LAN networking: desktop, server, and backbone.

The overriding consideration for desktop LAN connectivity is cost. With servers, it's speed that matters. And for backbones, distance is the key.

ATM's first opportunities are in LANs, and, more specifically, in the server and backbone regimes. The legacy LANs are generally expected to persist to the desktop through the year 2013. If so, where does ATM come in?

You would think that ATM would first appear in telephone company networks because the carriers invented ATM. Not likely. As happened with ISDN, the telcos will be slow to invest in ATM.

There are in fact two groups of ATM proponents now: ATM WAN and ATM LAN. And the ATM LAN folks are making much more progress in getting products to market. I know it sounds a bit far-fetched, but a significant number of the experts I've talked to sadly predict that ATM carrier services will be slow in coming and that perhaps WANs will still be using T-carrier circuits in 2013.

The ATM LAN sandwich is the picture that comes out of my interviews on the future of LANs. The sandwich filling consists of ATM LAN hubs, combining today's hubs, routers, T1 multiplexers, and PBXes. The top slice of bread is high-fiber non-ATM carrier trunk lines for WAN communications. The bottom slice is low-fiber legacy LANs to the desktop.

I've been told that no fewer than four LAN hub companies will be introducing ATM capability this year. When I tell such companies about my ATM LAN sandwich picture for the year 2013, they go ballistic — often accusing me unkindly of being too pro-Ethernet. They are counting on ATM trunks coming from the telcos soon and to the desktop soon, and therefore they expect an imminent grand simplification of WAN-LAN internetworking in a homogeneous ATM switching fabric. But this is not the consensus view of my vendor visionaries.

NOT READY FOR PRIME TIME. In talking with the many ATM proponents, it's clear that much work remains in the areas of standards setting, product development, and interoperability testing — work that will take the full two decades I'm projecting.

The base ATM technology is far from completion. Solving the harder problems of routing and service reliability for real-time traffic are still matters of research.

Second, ATM is not really a standard yet, but a family of technologies for which a number of protracted standards battles lay in wait — hopefully not as vicious as the LAN wars of the early 1980s. For example, WAN ATM and LAN ATM must be reconciled in order to provide a truly seamless ATM switching fabric. This work will require cooperation between telephone and computer companies.

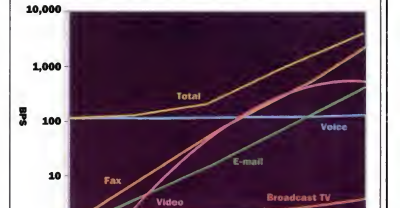
Third, ATM is gross overkill for any of those applications that are likely to develop in the near future — and most of today's computers are simply not capable of handling ATM transmissions.

Fourth, ATM proponents have been making excellent progress lately in finding ways to migrate from packet to cell switching. They are especially proud of plans to carry packets through ATM, which I must bluntly say is the worst of both worlds. To deliver the fruits of ATM, network protocols, operating systems, application programming interfaces, and the applications will have to be developed to employ cells from end to end. For those of you who have been waiting for Windows since you first saw it at Comdex in 1983, does ATM seem like a 20-year development effort?

All of this is not to say that ATM is not what we will all eventually need, want, and get. Nor is it to say that anyone should curtail their ATM efforts.

The very nature of networking requires the creation of an infrastructure before applications can be deployed. And so it's likely to be with ATM. I eagerly await the next 20 years of the networking industry. I hope it's every bit as exciting as the past 20.

Bob Metcalfe is publisher and CEO of InfoWorld Publishing Co. and inventor of Ethernet.



ENTERPRISE COMPUTING / MANAGEMENT

Businesses are making the Internet connection

More companies are turning to this data superhighway to find and serve customers

BY JAYNE LEVIN

Once the exclusive backwater of the federal government and academic researchers, the Internet, the world's largest computer network, has emerged as a giant "infomart" for Fortune 500 companies. Propelled by advances in computer power and packet-switched networks, the Internet is poised to become a staple of modern business communications.

Companies such as Coca-Cola Co., J.P. Morgan & Co., IBM, and Walt Disney Co. are discovering the benefits of the nation's de facto data superhighway — low-cost communications and an almost unlimited range of functions.

Since June 1991, the Internet has jumped from 2,982 interconnected networks supporting about 130,000 computers to more than 10,500 networks with more than 8 million users, according to a database maintained by Merit Inc., an Ann Arbor, Mich., firm that manages the National Science Foundation component of the Internet. The total number of users is expected to top 100 million by 1998, Merit officials say.

"The momentum seems unstoppable," says Christopher Locke, editor-in-chief of *The Internet Business Journal*, an Ottawa-based publication that premiers in June. While the distributed nature of the Internet makes it impossible to accurately calculate revenues generated from the exchange of goods and services, the "best thinking is that it will reach into the billions of dollars early in the 21st century," Locke says.

"In business terms, it's [certainly] a success," agrees John Shore, president of Entropic Research Laboratory Inc., a Washington start-up that designs software tools used to study human speech and develop voice-controlled computers.

By using the Internet as a delivery vehicle, Shore met a March 31 deadline for shipping the first commercial release of a new software product to reviewers at Cambridge University in Great Britain.

"[The] Internet speeds up development of products created entirely in-house," Shore says. "We can work quickly with experts around the world, and we can get feedback on our early revisions. It [also] improves our customer support, which increases our income."

Rapid communication over the Internet is helping to shorten the development cycle for new medicines and chemicals. Dr. Gregory S. Shotzberger, manager of Technical Assessment for Du Pont Merck Pharmaceuticals Co., in Rahway, N.J., uses public medical databases to explore new areas of research in the treatment of central nervous system disorders. The Internet helps Shotzberger quickly find experts for collaborative research and scan hundreds of reports to help Du Pont Merck bring new drugs to market faster, he explains.

The price of developing a new drug is so great — as much as $100 million that any reduction in development time translates into a major cost savings, Shotzberger says.

Other drug and chemical companies are getting in on the Internet act, too. Rohm and Haas, the Philadelphia-based company best known for inventing Plexiglas, has used the Internet for research activities since 1988.

Using the Internet to gain access to Minnesota Supercomputer Center Inc.'s high-powered systems, Thomas Cozzolino, a scientific programmer and analyst for Rohm and Hass, is able to analyze molecular structures of new chemicals. For example, to make a new plastic with certain strengths or insecticide with certain reactive properties, Cozzolino uses a computer simulation to "build" a molecule and then watches the behavior of the molecule under different temperatures.

The Internet is "a great time and money saver," Cozzolino said in an exchange of E-mail messages. "We get software fixes from vendors over Internet, write collaborative papers with academic and industry leaders, and search numerous on-line databases from our desktops. The days of slow, complex modem connections are over."

E-MAIL DOMINATES. By far, the largest use of the Internet is E-mail. Internet E-mail services span the globe, making just about anyone at or near a computer available. At CapDisc, a unit of Capitol Multimedia Inc., producer Tim Phillips says he sends about 25 E-mail messages a week to clients in Europe to discuss a project to translate interactive compact discs from English to French, Spanish, Italian, German, and Dutch.

"With electronic mail, I can say, 'Here's a script,' or 'Here's a moving image,' and I can send it to somebody who can see exactly what I'm doing," Phillips said. Using Unix to Unix Copy Program E-mail over UUNET Technologies Inc. links, he can participate in news groups to develop new products.

Even law firms, rarely eager consumers of new technology, are beginning to use the Internet, both for E-mail and to search and retrieve documents needed for case preparation. Wilmer, Cutler and Pickering, a Washington-based law firm, signed on to the Internet just two months ago and is already using it to communicate with colleagues and clients. In fact, says Wilmer partner David Johnson, the Internet connection was the deciding factor in winning a new client.

Johnson has also found another Internet service, "listserv," which he says has proven ideal for computer-based teleconferencing. A listserv conference is like a computer bulletin board, he explains, but is moderated, so an administrator can control which messages are posted. Interestingly, Johnson and about 30 other lawyers — including one as far away as Australia — set up a listserv to discuss the legal problems facing bulletin board operators.

TIME OF EXPLORATION. For many companies, it is a time of experimentation and exploration on the Internet.

"We're poking around," says a senior producer of special events at CBS Inc., in New York. CBS has a network address for each of its five news operations and hopes that an Internet connection will lower the cost of communicating with reporters on assignment in far-flung places. Not to be outdone by its commercial rivals, Public Broadcasting Service, in Alexandria, Va., is considering a plan to distribute program reports and overnight ratings to member stations over the Internet.

Since March, about 400 companies have reserved Internet Protocol addresses, hedging their bets against the possibility that addresses will become scarce. The Internet can accommodate about 2 million addresses and is expected to exceed its capacity in 1995.

Plans are under way to revise the addressing scheme, but until that happens, some companies aren't taking chances that they'll be locked out of this valuable service. Milwaukee-based Miller Brewing Co., for example, reserved 30 addresses in March, and Ryland Group Inc., a housing developer headquartered in Columbia, Md., set aside nine. The same holds true at Nordstrom Inc., where Robert Hayes, technology manager, says he reserved a class B address (which will support about 65,000 computers) so nodes will be available when the Seattle-based retailer decides to sign on to the Internet.

Many companies appear to be taking this precaution, fearing that the Internet will run out of addresses. Clearly, the Internet has gained respectability as an important tool for business communications. So many benefits are available that it's hard to see how any IS manager can ignore it much longer. As Nordstrom's Hayes puts it, "My goal is to position the company for maximum flexibility in communications."

Jayne Levin is a Washington-based writer who spends her free time surfing the Internet.

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Case Study

Dallas hospital restores central service, support

Presbyterian Healthcare strikes a balance between user and IS department needs

BY ALICE LAPLANTE

Recentralization, the restoration of centralized control of information technology, is catching on as companies recognize that not all problems can be solved by giving business units more autonomy. But that brings up another problem, namely: how to reintegrate the various disparate technologies that business areas have purchased.

There are no easy answers to that dilemma, but at least one company has developed a strategy to cope. Dallas-based Presbyterian Healthcare System has made LANs and departmental independence critical to a recentralization strategy, allowing each business area to continue choosing the best applications for its particular processing needs but mandating new responsibilities for IS.

Best of all, PHS is prepared to take advantage of new technologies without entrapping departmental employees in maintenance and support activities, says Mel Lively, network manager for PHS.

MISSION CRITICAL. Prior to October 1990, the various departments at PHS were responsible for their own IS budgets and, subsequently, all technology purchases, installations, and related support. Although most mission-critical functions for the hospital, such as accounting, insurance, and patient billing applications, resided on the mainframe, many departments had unique technology needs that the centralized IS department failed to provide.

Like most major urban hospitals, PHS hummed with activities, some of which had little to do with medical services. PHS had park and landscape services, cafeterias, even its own media center. Many of these departments contracted with external consultants and systems vendors for applications and systems that best fit their needs. That resulted in groups of highly diverse systems that didn't interact.

The problem was compounded by the fact that the three main host systems (from Unisys, IBM, and DEC) were connected to their terminals via different methods, rendering it impossible to transfer data or access one system from another's terminal. Some users had three terminals on their desks.

Obviously, that was not acceptable. Users wanted LANs and LAN applications. The newest medical applications are LAN-based, and Lively wanted to supply these to users. Users also wanted to talk to each other and get access to corporate applications through their PCs. And nobody wanted three terminals on their desks.

RECENTRALIZATION. But PHS was going to rope in departments that had previously gone their own technological way. Lively didn't want to alienate his users or force them to use substandard applications just because they ran on a certain approved platform.

So, starting in 1991, PHS adopted a five-year strategic information systems plan and created a network services department to migrate all departmental systems back into IS management. Maintenance and support were now IS' responsibility; departments would still control their technical budgets, but before purchasing a new system, they would go to IS, which would assist in finding the appropriate application. IS would buy it, install it, and integrate it with the network, whatever the platform. In the meantime, the departmental applications already in place would be brought back under the jurisdiction of IS, regardless of platform.

This flexibility is essential because critical applications often run on different platforms, Lively explains. "It's possible that the very best pharmacy system isn't going to run on the same platform as the very best laboratory system or the very best radiology system," he says.

The solution was in the form of a software package called CAI-Net, from Century Analysis Inc., in Pacheco, Calif. This Unix-based package integrates heterogeneous workstations, communications, and applications into a single system.

"For instance, we have a laboratory system that formerly interfaced to our main health information system, accounting, patient billing, etc., through an asynch communications link, but in the future will connect directly via Ethernet through the CAI system," Lively says. In effect, the laboratory system sends a message to the CAI system, which translates it and sends it to all the affected systems.

This centralized interface is going to simplify many formerly difficult connections, Lively says. For example, a future pharmacy system that may run on an AS/400 must connect to the main financial package, which runs on the Unisys mainframe. "Formerly, we had to have a direct link to every computer that needed to know about a change to a patient's record," Lively says. "Now we just give it to the CAI system, which in turn passes it to all other affected applications."

BUILDING THE NETWORK. As medical technology becomes more intertwined with office computers, Lively expects increasing demands on his network, demands that might have been impossible to meet without a central IS group to set standards and build the network. Emerging imaging applications are likely to have heavy bandwidth requirements, so Lively was careful to stipulate fiber-optics in the installation of campuswide cabling.

"All our hubs have an FDDI backbone, so we can do Ethernet and FDDI using the same hub," Lively says. "The only thing we're missing are the FDDI building and individually cabled each hub back to a central computer room. The backbone exists in the computer center instead of as a loop around the campus.

Groups of hubs and file servers are combined in the computer center to make up 20 segments of 100 PCs each. Individual segments terminate into Synoptics 3030 10Base-T hubs and are bridged via a redundant pair of Cisco AGS+ routers.

"In effect, the entire backbone exists in the routers," Lively says. "And 20 segments times 10Mb equals 200Mb of potential throughput."

There are lots of good reasons for doing this other than just the sheer speed, Lively says. Security is enhanced because the file servers are kept in the locked and environmentally controlled computer center, to which only authorized personnel are allowed entry. Maintenance is easier too, because if anything goes wrong, Lively says, "I don't have to drive to the other side of campus to fix it." Best of all, the system is virtually bulletproof. Only an extraordinary disaster in the computer room can bring down the whole campus.

PHOTO BY LES WOLAM / CAMMA LIAISON

Recentralization takes hold at Dallas hospital

WHO: Mel Lively

WHAT: Network Manager

WHERE: Presbyterian Healthcare System, Dallas.

PROBLEM: Communications and information access between multiple disparate host environments becoming increasingly inefficient. Individual departments were building their own applications without coordinating with other hospital departments.

SOLUTION: Established centralized controls of LANS and user support. Built a campuswide Ethernet backbone that connects all systems, regardless of hardware or software platform.

MOST SURPRISING LESSON LEARNED: How easy it was to convince departments to turn control over to IS. Users cannot be connected to the backbone network fast enough.

QUOTE: "You can't take someone's hard disk away, tell them they're absolutely dependent on the network, and then not have that network up 100 percent of the time. You'll soon be looking for another job."

The backbone is connected to the routers

Mel Lively, network manager of the Presbyterian Healthcare System, realized early in the network design process that performance was going to be a critical issue. With nearly 2,000 diskless PCs running all manner of applications, a standard network wasn't going to cut it.

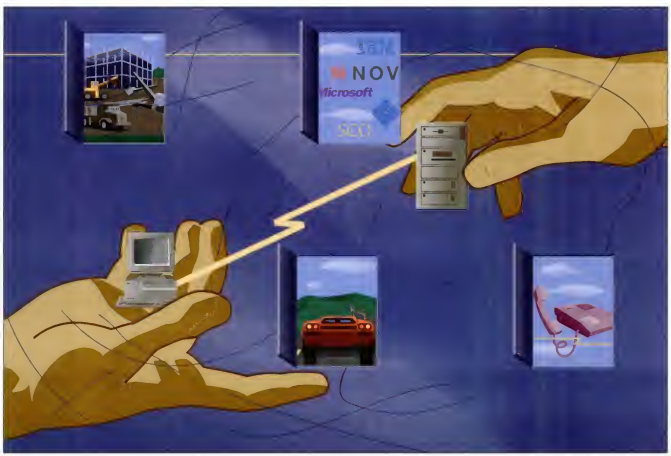
"I knew it would be difficult for 2,000 PCs to access WordPerfect off a single 10Mb network backbone," Lively says. When a user with a diskless PC calls up WordPerfect across the network, approximately three-quarters of a megabyte of data gets moved across the network, which is more data than a terminal would probably generate in two weeks, Lively says.

Unlike typical network designs, in which a fiber-optic backbone is connected to servers in each building, Lively put a separate hub in each

The backbone exists in the computer center instead of as a loop around campus.

IN THE ENTERPRISE

Windows NT



ANDREA KELLEY

When the desktop meets the high end

Microsoft reaches down to the desktop with Windows NT

By Lisa Raleigh

For years, Microsoft Corp. has been stretching up, up, up with Windows, trying to capture the attention of MIS managers and other enterprisewide decision makers with its mainstream, desktop operating system. The goal has been to convince the powers-that-be that desktop technology can be extended to address the broader needs of corporate computing. The motivation is obvious: the vendor that successfully ties together enterprise systems with desktop computing stands to win a formidable jackpot.

Inside

- TECHNICAL COMPARISON
- SUPPORT COMPARISON
- OEM AND 3RD-PARTY SUPPORT
- HANDS ON
- INTERVIEW
- POINT/COUNTERPOINT
- CASE STUDY

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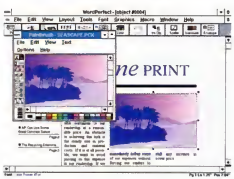

Now, one year and 2.1 million copies later, there's a new release.

WordPerfect 5.2 is more powerful, with advanced features (zoom edit and drag-and-drop text and graphics, for example) and advanced capabilities (it's mail-enabled, allows easy creation of envelopes and bulleted lists, and supports DDE and OLE).

Grammatik

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And it includes innovations you'll find nowhere else: QuickFinder, a versatile indexing and text retrieval system, and QuickMenu, a one-click shortcut to customized Button Bars.™

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WordPerfect®

DESKTOP

Continued from page S75

Despite Microsoft's best efforts, this strategy has hit a kind of glass ceiling, with IS professionals astutely holding back, waiting for better-tailored technology and a baseline of support and service that more closely resembles what they have come to expect from system vendors.

MIS managers have also typically lacked the inspiration to change their existing systems — if it ain't broke, why fix it? — and only recently have come

While other vendors may have a more reassuring track record, Microsoft still has one thing no one else has: unparalled access to the desktop.

under tremendous pressure to find more economical solutions to enterprise computing requirements.

With Windows NT, though, Microsoft may finally bring the high end and the desktop together, thanks to several factors: Microsoft has set out to build an operating system from the ground up that looks at the world from the big-system administrator's point of view; the company has realistically assessed — and compensated for — its own limits in terms of providing support and total solutions; and it may very well be in the right place at the right time with a technology that appeals to customers increasingly obliged to downsize, reduce costs, and streamline operations.

In short, Microsoft seems to be doing a number of things right with Windows NT.

ADOPTING THE IS PROFESSIONAL'S POINT OF VIEW. First and foremost Microsoft has designed Windows NT to account for the needs of information-systems management. It is not an iteration of DOS, but instead has risen whole as a 32-bit operating system designed to handle vital, client/server distributed applications.

The driving force in its development has been to provide access to high-powered hardware and massive storage while giving customers the security, reliability, and fault tolerance they need in order to risk placing their bet-the-business applications on Windows NT servers. To make the network administrator's life easier, Microsoft has taken special pains to ease the burden of configuring, maintaining, and managing systems linked together via Windows NT. Clearly, Microsoft has gone well beyond adding an interface to DOS and has endeavored to step into the shoes of its target audience.

While many of Microsoft's competitors may offer similar features — and may even have a more reassuring track record (after all, Windows NT is brand new, unproven, and still officially vaporous) — Microsoft still has one thing no one else has: unparalleled access to the desktop. If MIS managers want to tie their back-end systems to their desktop users, the fact is that, in the vast majority of cases, they'll be worrying about how to talk to Windows PCs. Thus, one of the main attractions of Windows NT will be its current and future compatibility with the de facto standard desktop operating system — Windows.

THE SUPPORT DILEMMA. Despite these technical advantages, though, Microsoft still lacks credibility in the corporate decision-making suite — primarily because it doesn't have long-standing experience in supporting enterprise accounts. Luckily for Microsoft, it is aware of its limitations in this area. Whether this is lucky for the customer remains to be seen.

To make sure that customers are adequately supported and serviced, Microsoft has decided to off-load as much of the after-sale hand-holding responsibility as possible to third parties, recognizing that its own resources to handle Windows NT customers are limited. Given Microsoft's limitations, this strategy probably makes a great deal of sense, but enterprise customers no doubt will continue to demand one-stop, direct-vendor support, and may balk at the channelization of follow-up care.

There will be a certain degree of direct support from Microsoft — for a price — including phone support, dedicated account-specific support engineers, and the like. Nonetheless, Microsoft is primarily intent upon building an external infrastructure for Windows NT support. It is paying special attention to value-added retailers (VARs) and systems integrators — training them, authorizing them, and deputizing them in the name of Windows NT. Microsoft is also investing substantial resources in helping customers help themselves with various information resources. While there's nothing inherently wrong with these strategies, it remains to be seen how well implemented and accepted they become.

CAN'T GO IT ALONE. Realizing that it can't win over corporate America on the strength of its own charm alone, Microsoft has also wisely courted other types of partners, especially original equipment manufacturers (OEMs) and application developers. With their endorsement, Microsoft looks even stronger to the corporate customer, and

Customers no doubt will continue to demand one-stop direct-vendor support, and may balk at the channelization of the follow-up care.

is stronger because the depth of the Windows NT product offering will live or die by the degree to which the rest of the industry supports it.

In fact Microsoft has amassed considerable enthusiasm among OEMs and developers. Many of its partners are investing significant resources toward the success of Windows NT and are, in fact, counting on NT to take them into new markets and to new levels of profitability. How has Microsoft inspired this devotion? It has played both ends against the middle. It has lured high-end players with the promise of connecting to the vast universe of Windows desktops, a strategy that then gives Microsoft the high-end solutions and connections that it requires to make Windows NT appealing to the enterprise customer. A win-win solution, in other words. At the same time Microsoft has capitalized on the long-standing desire among players in the PC community to move up-market and migrate products to the equally vast, enterprise customer base. Another win-win.

The bottom line is that Microsoft has surrounded itself with a host of supporters who extend and enhance what Microsoft is able to do on its own. The result is a forward momentum that none of Microsoft's competitors — chiefly OS/2 and Unix — has been able to create, even with years of market experience. In other words, while the competition may have logged more miles in the high-end arena, it hasn't ever developed a comparable ground swell of industry endorsement — which translates into customer options — like that which Microsoft has already established even before Windows NT has shipped.

The competition won't exactly be a pushover for Windows NT when it comes to technical features.

COMPETITIVE EDGE. The competition won't exactly be a pushover for Windows NT when it comes to technical features. While Windows NT has been designed bit-by-bit from the IS perspective, and contains lots of wish-list goodies, its OS rivals have been gradually refining their feature sets in such a way that they'll likely give NT a decent run for its money. Support and service, too, may be a close call because Microsoft is creating a new support paradigm for itself, and undoubtedly will have some lessons to learn, while some of its competitors — most notably IBM — have already regrouped and revamped their support structures in response to earlier mistakes.

NT's clearest advantage is that it's part of the Windows family. Everyone — from Microsoft's competitors, to its third-party partners, to its potential enterprise customers — must in one way or another account for Microsoft's dominance on the desktop. Given that, Microsoft has a strategic edge in bringing the high end and the desktop together.

Lisa Raleigh's Cupertino, Calif. company, Word to the Wise, specializes in editorial and publications consulting.

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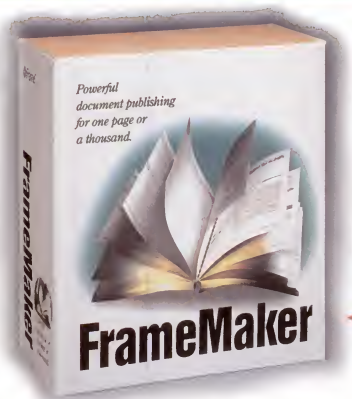

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TECHNICAL COMPARISON

The battle for technical superiority

Which 32-bit offering will win the hearts and minds of IS professionals?

ANDREA PELLEY

BY LES KENT

It's raining 32-bit operating systems! Actually, it's the flying debris from the battle over the Intel-based PC, where Microsoft Corp. is besieged by IBM Corp., Novell Inc., The Santa Cruz Operation Inc., Sun Microsystems Inc., and Univel.

Even if Microsoft keeps the lion's share of the market, the leftovers make an irresistible target. A small piece of the PC action is a lot of action.

With Windows NT, Microsoft has launched a strong counterattack, threatening to extend its dominance to new areas, such as engineering workstations and mission-critical file and application servers. In fact, the new 32-bit operating systems all focus on making high-end PCs suitable for client/server networking. This explosive market is shaping up to be the next major battleground for OS supremacy.

To be a contender means providing more efficient use of processing power and more storage capacity, plus more fault tolerance, security, robustness, connectivity, and manageability than the previous generation of 16-bit operating systems could offer. And there are some pretty formidable contenders. Windows NT may have put the rest of the OS world on the defensive, but its competition is strong nonetheless.

This article compares Windows NT and Advanced Server with five 32-bit enterprise networking solutions. Microsoft's new OS is facing IBM's OS/2 version 2.1 plus LAN Server 3.0, Novell's NetWare 4.0, SCO's Open Desktop, SunSoft's Solaris 2.1, and Univel's UnixWare.

All of these products run on IBM PC-compatible machines with Intel x86 processors, and all offer 32-bit operation, unsegmented memory, hardware protection, and network connectivity. Each is armed with a feature set suitable for mission-critical applications. And each is being promoted by experienced, well-heeled companies, which are pulling no punches in their efforts to succeed in the client/server market.

WINDOWS NT AND ADVANCED SERVER: BREAKING THE ROOKIE JINX? Windows NT and Windows NT Advanced Server are totally new products, built from the ground up. Windows NT features everything users and developers could have asked for, as well as a number of things they didn't even know they wanted. But the newness of Windows NT is a double-edged sword. For the prudent, "new" means untested, unstable, unsafe. On the other hand, new means that all of Windows NT's major features are part of its fundamental design. The integration is immediately evident when you use Windows NT. The cohesiveness of Windows NT—from installation to network connectivity to performance monitoring—is stunning.

An example of how a new start paid off is in NT's adoption of 64-bit disk addressing. With other 32-bit OS implementations, a disk volume can't exceed 4 gigabytes. Though this seemed infinitely large a few years back, it's beginning to seem smaller by the month. With Windows NT, a volume can be many millions of gigabytes.

Microsoft has taken two approaches to avoid the problems traditionally associated with the first release of a product. One is to ship an unprecedented 60,000 copies during a beta program that has lasted more than a year. The other is to name the first release 3.1. Will this combination of science and magic break the rookie jinx?

NOVELL NETWARE 4.0: STILL LEADING IN CONNECTIVITY. NetWare 4.0 by itself is not a comprehensive solution to enterprise networking. Still, Novell hasn't ceded the client market to Microsoft. DR DOS 7.0 is a gallant attempt to capture the workstation. But Novell doesn't currently offer a substitute for Windows 3.x. Generally, Novell has assumed a stance of peaceful, albeit nervous, coexistence with Microsoft, and so far this approach has worked. NetWare enjoys greater dominance in the server market than Windows has achieved in the LAN workstation market.

NetWare 4.0 takes a safer, more incremental approach to product enhancement than Windows NT. The changes from NetWare 3.x are significant without being radical. They address the most annoying problems of NetWare 3.x: its lack of protected mode, and its cumbersome way of managing system resources. NetWare 4.0's implementation of NetWare Directory Services (NDS) puts it at the head of the pack for enterprise management.

Novell is the aristocracy of connectivity, and here Netware 4.0 inherits a real fortune. The fly in the ointment is a continued lack of preemptive multitasking and support for symmetric multiprocessing (SMP). This should keep NetWare out of the market for real-time application servers and on-line transaction processing. Novell shouldn't wait too long for a more radical NetWare upgrade that supports SMP, but for now its lead in connectivity will allow NetWare to continue to thrive.

OS/2 2.1 AND LAN SERVER 3.0: A YEAR'S HEAD START. OS/2 has more than a year's head start on Windows NT as a 32-bit, protected-mode operating system. The 2.1 beta version of OS/2 shows its maturity, and should permanently dispel any notion that IBM is at sea when it comes to PC operating systems.

IBM has positioned OS/2 as the premiere client and the premiere server. To be the premiere client implies that OS/2 is a better environment for Windows applications than Windows. This sounds like a stretch, but it's actually not that farfetched. OS/2 supports multiple Virtual DOS Machines (VDMs), so that each 16-bit Windows application runs in its own protected space. If a 16-bit Windows application crashes, it doesn't bring down other ones running in separate VDMs. Under Windows NT, a misbehaved 16-bit Windows application could bring down all the other 16-bit programs.

OS/2's object-oriented user interface is nice, even if you're not quite sure what object-oriented means. It's neat to drag an icon of a file to an icon of a printer and cause a report to be printed. OS/2's underlying System Object Model reportedly makes it easier for programmers to develop native 32-bit OS/2 applications.

The most obvious flaw with OS/2 2.1 and LAN Server 3.0 is really a positioning problem. IBM is promoting a hierarchy of operating systems for enterprise computing, starting with DOS for entry level systems, moving up to OS/2 for clients and low-end servers, and culminating in RS/6000-based AIX (Unix) systems for power workstations and servers. Compared to Microsoft's "Windows Everywhere" strategy, or SunSoft's end-to-end Unix solution stretching from portables to supercomputers, IBM's approach seems disjointed.

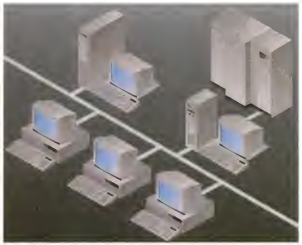
THREE OPERATING SYSTEMS CALLED UNIX. While Microsoft stalks the Unix market with Windows NT, The Santa Cruz Operation, SunSoft, and Univel are pursuing the PC OS market with revamped versions of Unix. Until recently, Unix was confusing because of its multiplicity. Applications written for one variant of Unix didn't work on the others. This may explain why in 1992 PC-based Unix software accounted for only about 1 percent of the PC OS market. The recent agreement by Univel, SCO, Sun Microsystems, Unix Systems Laboratories (USL), IBM, and Hewlett-Packard Co. to deliver a Common Open Software Environment (COSE) across their Unix system platforms should standardize the Unix market and thereby attract more software developers.

Under the open systems philosophy of COSE, product specifications are made available and companies may develop their own copies or license products from their original developers. The question now is how Unix providers will differentiate themselves. To add value, Unix vendors will have to rely less on raw features and more on implementation, pricing, distribution, and support. It's hard to see how any of the Unix suppliers will be able to convert many users away from DOS or Windows, but they are likely to

See TECHNICAL, page 582

INTRODUCING WINDOWS NT. FINALLY, A CLIENT-SERVER PLATFORM THAT EMBRACES DIVERSITY.

There's a lot of serious rethinking going on in the area of information management. Because companies need to take advantage of new technology while keeping the best of their existing systems. They need to go to client-server computing. Without moving out of the mainstream.



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Above: Windows NT delivers power, reliability and open architecture for client-server computing.

Right: This versatile operating system platform includes versions for both clients and servers.

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TECHNICAL

Continued from page S79

lure Unix users onto the PC platform.

Univel is a partnership between Novell and USL, which Novell is acquiring from AT&T. Novell has played a pivotal role in allowing enterprises to interconnect diverse computer platforms, and Novell was, fittingly, the force behind bringing native NetWare support to Unix.

According to Novell, NetWare is mainly for services, such as files, printers, connectivity, imaging, and messaging. UnixWare is an application environment, either for multiuser applications that address dumb terminals or X-Windows clients, or for databases such as Oracle and Informix. Although UnixWare does not currently support SMP, it does offer preemptive multitasking, which gives it a shot at real-time applications.

With UnixWare, Novell is gunning for sites with a large investment in NetWare that want an all-Novell solution that can include Unix and DOS clients and a combination of NetWare and Unix servers.

SunSoft is a large software development company (1,200 programmers) with a strong base of Unix users running on Sun's Sparc platforms. SunSoft now offers Solaris—based on Unix System V, Release 4—on both Sparc and Intel-based PC platforms. Solaris supports SMP, enhanced security, and on-line backup, making it suitable for mission-critical applications such as databases and transaction processing.

SunSoft has positioned Solaris-based PCs as clients, and Solaris-based Sparc systems as servers, in line-of-business environments that require distributed processing. The company sees Solaris as a complete solution spanning the entire network enterprise, offering a powerful alternative to the Windows family. This is not a strategy of coexistence but of conquest.

SCO has a head start of several years over Novell and Sun in bringing commercial PC users 32-bit, protected-mode software capable of SMP. The current market leader, SCO describes itself as an integrator of technology rather than a developer. With no products to protect, SCO can offer whatever solutions the market demands.

SCO has purchased licenses for SunSoft's ONC/NFS networking technologies, and has announced its intention to include NetWare Unix Client services as part of SCO's Open Desktop. As Unix becomes more standardized in the post-COSE era, SCO's experience in lining up application developers and marketing their products through mature PC/Unix channels may give them a leg up on UnixWare and SunSoft. SCO's strategy is one of coexistence with everybody, especially Microsoft. Open Desktop includes a LAN Manager for Unix client and has an optional LAN Manager for Unix server. It is the only Unix currently offering Windows NT connectivity.

COMPARING FEATURES. Feature comparisons are risky with products that are still in beta; features can be added or removed before the ink dries. After the COSE agreement, comparing different variants of Unix is especially tenuous because a frenzy of cross licensing may well change the feature landscape overnight. Keep these caveats in mind as we take a quick tour through the most significant features of these operating systems as they stand today. We will use Windows NT as the reference point for each feature category.

APPLICATION COMPATIBILITY. Microsoft's Win32s application programming interface (API) supports any Windows environment, and so is guaranteed to attract more developers than other APIs. Windows NT also supports the more powerful Win32 API, which is restricted to Windows NT applications. Windows NT can also run DOS programs and has limited ability to run 16-bit OS/2. Windows NT's Posix API allows some Unix applications to run after they're recompiled, but Windows NT isn't a practical environment for Unix programs.

How well does the competition support the desktop standard(s)? OS/2 has great DOS and Windows 3.1 support (it runs actual Windows 3.1 code) to go along with its support for native 16- and 32-bit OS/2 programs. SCO's Open Desktop supports DOS but does not yet have a solution for Windows applications. Solaris will offer a Windows 3.1 emulator. UnixWare will run actual MS-DOS or DR DOS as well as Windows 3.1 code (though the Microsoft products won't be bundled).

All the Unix systems can run various strains of pre-COSE Unix applications. NetWare 4.0 is not a general-purpose OS, but Novell has been promoting client/server applications on the server with some success, and NetWare 4.0 may be the platform that allows this effort to take off.

No matter how compatible all of these platforms become with each other, though, Windows at the desktop will drive application development. Given this scenario, Microsoft—with Windows NT and with everything else—will continue to remain a step ahead in terms of pervasive application compatibility. And even though OS/2 can run the base of existing Windows applications, many developers will be drawn to the Win32 API for their future products.

SYMMETRIC MULTIPROCESSING AND MULTITHREADING. Symmetric multiprocessing (SMP) and multithreading take advantage of multiprocessor systems by running tasks concurrently. With the right applications, such as SQL databases, SMP systems make it possible to achieve linear CPU performance (i.e. performance that does not degrade). For example, an eight-processor system may execute an application 7.5 times faster than a single-processor system. The client/server model tends to move processing duties from the requester to the server. SMP is wonderfully suited to facilitate the transition to client/server networks.

Although there are currently few multithreaded applications that take full advantage of SMP, and despite the fact that they are more difficult to write than single-threaded programs, the market will reward the effort in mission-critical commercial applications and engineering applications where saved time can be easily equated to saved dollars. Even in the absence of such applications, multithreaded kernels such as Windows NT and multithreaded SQL engines will automatically take advantage of multiprocessor systems to deliver significantly higher performance than uniprocessor systems.

Microsoft's Windows NT, SunSoft's Solaris, and SCO's Open Desktop are the only operating systems examined here that currently support SMP. IBM has announced the incorporation of SMP in a future release of OS/2, which will use the Mach kernel from Carnegie-Mellon University.

CONNECTIVITY. Windows NT is the ultimate tool for integrating Microsoft products. Unix is the best way to network Unix products. OS/2 is a great client but has some weaknesses as a server. And NetWare remains the best way to harness mixed-platform networks.

Windows NT offers impressive integration of Windows NT workstations. This includes setup, administration, security, printing, and performance tuning. Each Windows NT workstation is network ready and includes peer-to-peer file and print sharing. Windows NT Advanced Server supports NetWare LAN integration with MS-DOS, Windows, and OS/2-based client PCs for file and printer sharing. Macintosh connectivity is also available as an option, as is a new Systems Network Architecture gateway. Windows NT includes nonroutable NetBEUI, TCP/IP, and DLC protocol stacks. Windows NT's TCP/IP stack is suitable for client/server applications but offers no Network File Service (NFS) support.

NetWare has a big edge over Windows NT with highly functional server implementations of all the leading protocols including IPX and NCP, AppleTalk, TCP/IP and NFS, and OSI and FTAM. While Windows NT can connect to Microsoft products, NetWare 4.0 can connect to anything.

Novell's NFS implementation for NetWare is prized for its robustness. Although many Unix administrators look to NetWare NFS simply as a means of connecting MS-DOS and Windows-based PCs, in practice it's a great way to achieve fault tolerance (with disk duplexing and server mirroring) for Unix-only environments. In contrast, Windows NT cannot be a server to Unix without third-party support.

Like Windows NT, OS/2 uses the nonroutable NetBEUI protocols. IBM provides TCP/IP and NFS protocols as an option. OS/2 can operate peer-to-peer with LAN Server, which provides traditional LAN Manager 2.x functionality, such as domains for efficient administration of security. Unix client connectivity is an option with LAN Server 3.0. In spite of the server functionality that IBM provides, OS/2 is still more funetional as a client than as a server.

FAULT TOLERANCE. Windows NT's unique support for RAID Level 5 provides the most economical fault tolerance available for disk subsystems. NetWare 4.0, with SFT Level 3, is the only product that supports duplexed servers, and is therefore arguably the most fault-tolerant OS. None of the Unix systems have standardized on fault tolerance to the levels reached by Windows NT, NetWare, or OS/2 (when used with LAN Server 3.0). A significant level of fault tolerance for the Unix systems requires third-party solutions.

ROBUSTNESS. The primary architect of Windows NT, David Cutler, also designed the VMS system for Digital Equipment Corp.'s VAX family of minicomputers, generally considered to have excellent robustness. Windows NT's design goes after robustness by drastically minimizing the size and functionality of its unprotected kernel and putting modular system components into protected memory. As a result, many parts of the total system are protected.

This high degree of modularity follows

See TECHNICAL, page S99

Claims to fame

Windows NT from Microsoft
A radically new product done the right way—from the ground up. The spec sheet sounds like perfection, and the Win32s API should attract a flood of applications. Portable, scalable, object-level security, built-in networking, beautiful integration, plus symmetric multiprocessing (SMP) support... but can it all fly?

OS/2 2.1 from IBM
A year's head start with 32-bit protected-mode operation, excellent coexistence with Windows, and a great desktop object metaphor. Big Blue is very big, and is putting a lot of effort into OS/2. But so far no SMP, and no flood of native OS/2 applications, despite the one year lead. Also, connectivity is limited by LAN Server.

NetWare 4.0 from Novell
The leading server operating system is evolving steadily. Unmatched connectivity and greatly enhanced naming services are a boon to enterprise networking. Some technical shortcomings ought to be addressed in later releases: limitations in protected mode, plus lack of preemptive multitasking and SMP.

Solaris from SunSoft
SunSoft is the leading Unix developer, and many future Unix innovations are likely to come from this prolific software machine. Unix buffs are salivating over the combination of Solaris technology and PC economy. Solaris is new to the Intel platform, and so may take some time to settle down.

Open Desktop from SCO
As integrators rather than developers, SCO absorbs whatever makes sense. Lots of SunSoft software made sense, as well as SCO's Motif graphical user interface, which COSE has anointed as the industry standard. SCO's massive application suite and long experience with PCs has made it the Unix of choice for small businesses.

UnixWare from Univel
UnixWare offers seamless, IPX connectivity to NetWare and, with Novell's acquisition of USL, has an impressive pedigree. But it's the only Unix without multiprocessing support. With DR DOS and NetWare, UnixWare gives Novell broad coverage of OS solutions. Is this synergistic or just complicated?

—Les Kent

SERVICE & SUPPORT

Who ya gonna call?

How does Windows NT compare to OS/2 and Solaris on a support and service basis?

By Alice Plante

With the debut of Windows NT, high-end customers now have access to a full range of powerful 32-bit operating-system options that permit delivery of mission-critical applications in a truly distributed environment.

The good news: Sophisticated enterprise-capable power is available at previously unheard-of price points.

The bad news: If you get into trouble, who ya gonna call?

This is not a trivial question.

Until recently, support for the kind of OS capable of running your enterprise was a relatively straightforward matter. The software was bundled with the hardware — usually a mainframe or minicomputer — which was licensed directly from the vendor or through a limited number of knowledgeable representatives. Upgrades, bug fixes, and customer questions were resolved via a standard contractual agreement. Many corporations even had a dedicated vendor support representative on-site to solve more urgent problems.

You had a question, you made a single telephone call. End of story.

The drawback: It was expensive for vendors to maintain the infrastructure that made this kind of attention and hand-holding possible. Operating system licenses, upgrade fees, and support contracts were therefore proportionally higher priced.

With the advent of PCs, however, all this changed. Customers wanted product; they wanted it available immediately from their local retailer, value-added retailer (VAR), or distributor; and they wanted it at the lowest possible price.

But what this price has increasingly precluded is technical expertise on the part of the seller.

MEETING DEMAND, MAINTAINING MARGINS. Vendors such as IBM Corp. (OS/2), SunSoft Inc. (Solaris), and, of course, Microsoft Corp. (Windows NT) are thus facing their biggest challenge in the support arena to date: To provide the level of support increasingly demanded by users, while staying within the tight profit margins of the PC industry.

Upon the pending debut of Windows NT, InfoWorld asked key corporate developers and support professionals to state their requirements. Here's their message to desktop OS vendors, followed by a look at how Microsoft, IBM, and SunSoft measure up:

• *Separate sales from support in the channel.* An ever-growing number of corporations want the freedom to buy desktop hardware and software products from the cheapest possible source. But they don't want to be dependent on these suppliers for support.

The problem: Vendors often want these less-than-expert low-overhead sellers to provide "first-level" support to an increasingly sophisticated and demanding customer base. Buyers want to go directly to a technical representative at the vendor without having to "escalate" the problem through channel bureaucracy.

• *Tell us where channel expertise lies.* Those corporations that prefer to buy product from VARs or dealers with a higher level of knowledge, training, or experience ask vendors to create an accreditation program to identify such individuals — and make this accreditation count. No Mickey Mouse, half-day certification programs, please.

• *Provide unlimited, toll-free telephone support.* No one is willing to give in on this one. Pay for it, yes. Compromise, no.

• *Assign a personal technical advisor.* Rather than getting a different person every time they call, corporations request that an account manager be assigned to each corporate account.

• *Provide on-line support options.* Corporations want the capability to ask questions electronically via bulletin boards or forums. They also would like to send and receive E-mail to and from vendor technicians, and be able to download fixes and bug reports as they become available.

• *Eliminate finger-pointing.* One of the trickier aspects of the downsized client/server world is that it can be difficult to tell what's gone wrong in a multivendor environment. Users want help, not a game of "I'm-not-to-blame" telephone tag.

• *Offer incident problem-solving and "house calls."* Even if a site doesn't opt for an on-going support contract, give it the option of calling in a vendor-expert for an hour, a day, or a week, when necessary.

• *Training, training, training.* Vendor-created (or authorized) training courses on specific aspects of the operating environment, delivered either on-site or at a convenient location, are a must.

• *No snubbing. Ever.* Last, but certainly not least, customers want prompt and courteous attention to their problems — no matter what. If they paid legal tender for your product, and they need help, give it to them.

Vendors don't have a captive audience any more. Punishing customers for whatever other product or service choices they might have made is definitely outré. It's a brave new multivendor world out there.

MICROSOFT: CREATING STRONG THIRD-PARTY SUPPORT. The new kid on the 32-bit operating system block has made a valiant attempt to listen to these specific user concerns. At the same time, Microsoft hasn't attempted to bite off more than it can chew. Microsoft's strategy: Divert as much of the support burden to third-party service providers as possible.

As customers have requested, Microsoft has opted to view distribution and support as two separate functions. That is, Microsoft doesn't expect the people who sell Windows NT to necessarily be expert about its technical intricacies. Thus, Windows NT will enjoy

ANDREA ISAACS

"unrestricted" distribution. Anyone can sell this product. There will be no attempt at sales channel "authorizations," no minimum training requirements, no accreditation of any sort before organizations are allowed to join the Windows NT distribution network. Support will be available directly from Microsoft, to a certain extent, but primarily from authorized third parties.

(Microsoft is even distancing itself from the Windows NT distribution process; although it will satisfy upgrade requests, it will not attempt to sell new Windows NT licenses. Thus Alan Yates, Microsoft's channel manager for solution providers, estimates that 85 percent of Windows NT sales will go through non-Microsoft organizations. The remaining 15 percent of Windows NT licenses will be in the form of upgrades issued directly by Microsoft.)

What this means, of course: The person who sells your company its Windows NT license doesn't necessarily know anything about it. If you buy from a VAR or system integrator, you may receive support from that organization. Otherwise, you may be obliged to seek support from a third-party support outfit or from Microsoft itself.

Microsoft will provide free basic support to Windows NT users via the popular on-line service networks. If you're a subscriber to CompuServe, Prodigy, or America On-Line, you can take advantage of electronic support services via Microsoft-sponsored forums on these networks. You can send questions electronically, and Microsoft employees will respond to them — also electronically. Also available via these electronic support networks will be the ability to download Windows NT bug fixes, patches, and sample code.

Other than this, however, prepare to pay. Microsoft offers no other kind of direct support that comes free with the purchase of a copy of Windows NT.

This obviously creates an enormous support vacuum. Microsoft has decided to fill this vacuum with a new class of third-party service provider. With its Solution Provider Program, Microsoft hopes to give rise to an ocean of savvy and experienced professionals who will help corporate Windows NT sites with development and support requirements.

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SUPPORT

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At the heart of the Solution Provider Program is "NT Inside Track," a Microsoft-sponsored, three-day training-the-trainer program targeted toward Windows NT distributors, original equipment manufacturers (OEMs), VARs, and systems integrators. NT Inside Track graduates are provided with training materials and courseware and are, in turn, expected to pass on what they learned to their employees, franchisees, and end users. In effect, Microsoft is "seeding" the channel with Windows NT experts who will then funnel their expertise to others. MCP (Microsoft Certified Professional) certification will be awarded to anyone who successfully passes Inside Track training and testing.

For training professionals, the Inside Track seminar will give them the authority to deliver Microsoft University Windows NT courses. Two Microsoft University NT courses are currently available: one for corporate developers, and one for integrators and support professionals. As with other Microsoft University courses, these will be available both from authorized third-party training organizations and directly from Microsoft.

While off-loading as much support as possible, Microsoft will also offer Windows NT telephone support on a toll call basis. Customers can buy "premium" — i.e., unlimited — telephone support on a contractual basis, or on an incident basis for an hourly rate. Prices for Windows NT "incidents" had not been set by press time; however, Microsoft charges $150 per incident for LAN Manager calls.

Another premium support option: Microsoft will assign your corporation a personal account manager who will be your point of contact within Microsoft for all Windows NT questions and problems.

According to Yates, although contract prices had not yet been set, they would generally be higher than similar services offered by third-party providers. In short, Microsoft wants to encourage its customers to use other support options. "Frankly, we think others offer a great deal more value than Microsoft can in hands-on support of corporate multivendor environments," said Yates.

THE HP MODEL. Microsoft claims to be modeling its Windows NT support strategy after Hewlett-Packard Co.'s legendary service offerings — yet only to a point.

True, the only base support that comes with HP/UX — HP's version of the Unix operating system that runs across its Unix desktop and server offerings — is electronic, delivered via an HP on-line bulletin board. Another similarity is that HP customers pay for telephone support and for an escalating number of "premier" services. But HP is not trying to assign responsibility for any support activities to third-party providers. On the contrary, HP considers support to be a major source of income.

The numbers speak for themselves: HP's revenues from service and support programs grew by more than 17 percent to $4.1 billion in 1992, and represent a full 25 percent of HP's worldwide net revenue.

Moreover, realizing that the rapid proliferation of networked, desktop Unix client/server sites require more specialized knowledge, HP created a class of VARs specifically accredited to sell HP/UX on the networked desktop. Called "Certified Workstation Resellers," these VARs have gone through training that ensures no HP/UX neophyte will be selling one of HP's flagship products. And all this shows. In 1992, DataPro awarded HP its prestigious first prize in the Unix support category.

HELPING CUSTOMERS HELP THEMSELVES. Besides seeking third-party partners, Microsoft also differs from HP by placing emphasis on programs that will allow corporations standardizing on Windows NT to help themselves.

Recognizing that there will be two types of corporate NT users — developers and support professionals — each with distinct requirements, Microsoft has created two separate programs designed to provide the tools and resources for corporations to do their own smooth Windows NT implementations.

For internal corporate developers, the Microsoft Developer Network Program (MSDN) costs $195 annually and entitles developers to CD-ROM-based Windows NT reference manuals, as well as interval bug fixes, updates, and code patches. For internal support professionals and integrators, Microsoft offers the $295 Technet service, which also provides CD-ROM-based reference materials, including the same database that Microsoft's internal support technicians use to resolve customer problems. Also included: code fixes, sample code, and problem-resolution guides. A monthly newsletter will contain tips for internal, corporate Windows NT support coordinators and integrators.

Microsoft has put together an impressive support program that goes a long way toward meeting the needs of enterprise technology managers. Specifically, its separation of distribution and support resources in the channel, its recognition that there will be two distinct type of corporate users (developers and support professionals), and its attempt to educate the consulting and support community about Windows NT are all commendable moves. However, the lack of a toll-free 800 number for any Windows NT user, and the attempt to "channel" support calls away from Microsoft to third-party providers, may not please customers who want a direct line to vendor experts.

IBM: COME A LONG WAY. Nowhere is IBM's well-publicized struggle to redefine itself more apparent than in the service and support arena. Long accustomed to being perceived as the ultimate service provider at its mainframe installations, IBM in the last few years has had a major comeuppance with the debut of OS/2. A complex and powerful product, OS/2 was sold through the same channels as the relatively simple DOS operating system — with the same provisions for customer support.

IBM's initial OS/2 support report card was therefore dismal. Customers who bought OS/2 from retail dealers or IBM mainframe sales representatives were appalled at the lack of knowledge; calls to IBM support lines resulted in runarounds or recommendations to call somewhere else in the company. True, large dedicated IBM shops with major OS/2 development projects underway received the famous IBM quality service. But many others simply felt between the cracks.

Customers complained — loudly. and IBM listened.

With the introduction of OS/2 2.0 last year, IBM made some dramatic changes. For the first time, a toll-free 800 line was established, making unlimited free support available for anyone with a legitimate copy of OS/2. Site configuration and problem reports were carefully tracked in a customer service database so customers didn't need to re-explain their configuration every time they called. And IBM is currently in the middle of revamping its OS/2 training strategy for dealers, VARs, and systems integrators to provide an in-depth multichannel expertise, according to John Patrick, vice president of sales and marketing for IBM's personal software products division.

Unlike Microsoft, IBM has decided to tackle the support issue itself. To avoid the finger-pointing that so frustrates corporate users, it is inking a number of deals that will allow direct transfer of telephone-support calls from IBM technical representatives to the technical experts at OS/2 OEM or independent software vendor (ISV) companies. In short: You may dial an IBM 800 number, but, without redialing, you may end up talking to a technical expert at Borland International Inc. or Dell Computer Corp.

ON-LINE AND CUSTOMIZED SUPPORT. On-line support is also available free to any OS/2 customer through one of four separate IBM-sponsored CompuServe forums. The "OS/2 User" forum contains general tips and techniques for the general desktop user of OS/2. End-user tools, shareware, and a list of OS/2 applications are available through this forum. Users can also post questions for IBM support representatives. "OS/2 Support" answers questions and provides help to corporate IS professionals responsible for supporting OS/2 applications for their organization's internal users.

Finally, two separate OS/2 developer forums provide bug fixes, updates, and a way for developers to get more complex technical questions answered. IBM also sponsors an Atlanta-based bulletin board that OS/2 users can dial into.

For corporations using OS/2 as the foundation for enterprisewide development efforts, IBM created the OS/2 Application Assistance Center. Services range from one- to two-day "database tuning" activities to customized support contracts that aid OS/2 developers throughout the application cycle. Application design reviews, contract coding, and LAN and database services from design to final implementation are all available.

IBM also offers OS/2 classes at its Dallas center, at local IBM offices, or even at customer sites. Classes can be customized to meet the development requirements of a particular project.

IBM is also working to make sure a

See TECHNICAL, page S99

Strategies in a nutshell

WINDOWS NT

Vendor: Microsoft Corp.
Strategy: Shift as much of the support burden as possible to third-party suppliers. Charge for everything but basic on-line services.
OS distribution: Completely open.
Support certification for third-party support suppliers: Yes. Microsoft Support Provider (MSP) program.
Support certification for third-party trainers: Yes. Microsoft University course certification.
Telephone support: Available on a pay-for-incident and contractual basis only.
On-line support: CompuServe, America On-Line, Prodigy.

OS/2

Vendor: IBM Corp.
Strategy: Provide free unlimited support to anyone with a copy of OS/2. Provide "premier" custom support offerings for corporate developers. Negotiate a broad range of support services from help desk operations to custom technical hotlines on a customer-by-customer basis.
OS distribution: Mostly open (officially limited to IBM Authorized Dealers, but no basic training or expertise required, and unofficially available from a broad range of suppliers).
Support certification for third-party support suppliers: No.
Support certification for third-party trainers: No. But a wide range of courses available through IBM.
Telephone support: Unlimited toll-free support.
On-line support: Four CompuServe forums; dedicated IBM bulletin board system.

SOLARIS

Vendor: SunSoft Inc.
Strategy: Make the third-party channel the first line of support for Solaris users. Provide 90 days of free telephone support direct from SunSoft. After that, customers will be referred to channel.
OS distribution: Mostly open (agreements have been signed with virtually all major distribution players).
Support certification for third-party support suppliers: Yes.
Support certification for third-party trainers: Yes.
Telephone support: Toll-free support for first 90 days.
On-line support: CompuServe forum in beta test.

—Alice LaPlante

OEM AND THIRD-PARTY SUPPORT

Building an infrastructure

Microsoft recognizes that it needs solid partnerships to give it credibility at the high end

By Amanda Hixson

Very few sane people disagree that Microsoft Corp. is the undisputed owner of the PC desktop. With unit sales of well over a million per month, Windows 3.1 clearly has no competition in its class. Toss in various versions of MS-DOS and it's easy to concede the vast majority of the PC desktop to Microsoft.

However, Microsoft has had a tough time pushing Windows 3.1 into the high

A long list of companies are more than willing to bet valuable resources on NT's success.

end of the market. Windows, and its current variants, are not perceived by many in the industry as products that address corporate America's transaction-laden, mission-critical computing needs.

In order to truly claim Windows NT a success, Microsoft has to win the hearts and souls of finicky corporate IS managers and corporate users — and it will need more than technical wizardry to do so. With a stated first-year goal of capturing 10 percent of the high-end client/server market (equal to roughly 1 million Windows NT units sold), it is imperative that Microsoft identify partners — original equipment manufacturers (OEMs), value-added retailers (VARs), and developers — to help it crack the high-end corporate nut, where sales of a million units of almost anything is staggering.

In fact Microsoft has already managed to create a formidable ground swell of support for Windows NT in the hardware and software communities. The hardware support comes from PC vendors wanting to move up to the high end, as well as from already-established, bigger systems integrators and manufacturers wanting to gain access to the Windows desktop.

INDUSTRY HEAVYWEIGHTS. Thus far, Microsoft has scores of OEMs signed up to ship Windows NT on their latest and greatest boxes — including industry heavyweights such as Digital Equipment Corp. (DEC), Compaq Computer Corp., NCR, NEC Technologies Inc., and MIPS Computer Systems Inc. And their interest isn't casual. DEC, for instance, plans to make Windows NT the operating system of choice for its new Alpha platform.

In the independent software vendor (ISV) development arena, Microsoft claims to have placed more than 60,000 Windows NT software development kits (SDKs) in the hands of developers. At the same time, it has seeded 4,000 corporate accounts with the Windows NT beta. Between in-house and ISV developers, there are purported to be 2,300 mission-critical applications already in development. Microsoft also estimates that a staggering 25 percent of the applications being ported to Windows NT are coming from Unix and other high-end operating systems.

As we all know, Microsoft can generate numbers faster than the Roadrunner can clobber Wile E. Coyote on Saturday morning, so it might be tempting to view these figures as exaggerated. But if Microsoft believes them, so do its partners, and a significant number of companies are investing impressive resources toward the care and feeding of the Windows NT market.

"The NT market is going to be quite large," said Michael Gambier, Windows NT Marketing Manager at Digital Equipment Corp. DEC clearly has a lot riding on Windows NT's success, with "more people working on NT marketing than Microsoft [has]," said Gambier.

What's the attraction? First of all, Microsoft offers something that everyone wants: the most direct access to the vast installed base of Windows users. Partner with Microsoft and stake your claim.

To attract high-end developers, Windows NT 3.1, and planned subsequent NT releases such as Windows NT Advanced Server, are positioned as supersets of Windows 3.1 and Windows for Workgroups. Thus, a developer that writes to the Win32s Application Programming Interface (API) can reach Windows NT users as well as potentially millions of other Windows users.

Software AG, a company known for portable application development environments such as NATURAL, sees Windows NT as an extension of Windows 3.1 for server technology. Software AG is accustomed to selling several thousand mainframe versions of some of its products over a period of decades. Consequently, it's easy to understand that the potential of a one-million-units-in-the-first-year NT installed base is "mind boggling," according to Dave MacSwain, vice president of product marketing for Software AG.

Win32s, then, is a carrot with which Microsoft hopes to attract high-end developers by reducing concerns about processor dependence on specific operating-system implementations. By the same principle, existing desktop code can go up a multiple processor line. This means current desktop developers can move upward toward computing's high end by taking advantage of new features made available by additional calls in the full Windows NT system.

Windows NT is designed specifically to encourage ports (or complete rewrites) of many 16-bit Windows and DOS applications to Windows NT's 32-bit mode via Win32s.

TECHNICAL MERITS. Another attraction is the raw technical capability of Windows NT itself. According to Mike Flanary, NCR's senior product manager in the general-purpose, platforms business unit, NCR has a major interest in the symmetric multiprocessing (SMP) capabilities of Windows NT and feels that NT "technically has a lot of merit and is very mature for a 'first out' product."

Like many others who've signed onto the Windows NT bandwagon, Flanary believes that NT will create "new products with a higher level of sophistication than [current] traditional applications, as vendors move into the high-end marketplace," and that it will accelerate the development of true client/server applications.

Scott Winkler, director of systems marketing at Sequent Computer Systems Inc., a maker of multiprocessor servers, also sees tremendous potential in SMP on Windows NT. He has no difficulty envisioning "up to 30 processors" in use at one time, and a time when many applications will take advantage of Windows NT's 32-bit abilities in areas such as high-end financial applications and human resource systems.

Despite the enthusiasm within the budding Windows NT infrastructure, there's also a note of rational caution. After all, Microsoft has yet to prove whether Windows NT will deliver on its many promises. Nonetheless, a long list of companies is more than willing to bet valuable resources on Windows NT's success. Microsoft's partners consistently rave about Microsoft's marketing juggernaut; its support, tools, great product design, willingness to listen, and technical expertise; as well as Windows NT's potential for growth. In short, "Microsoft equals success," said Michael A. Ryan, chief technical officer for KnowledgeWare, an independent software vendor.

Bottom line: If Microsoft fails with Windows NT, it can only blame itself. The company has convinced a host of partners that it will make a significant dent at the high end. Convincing customers is the next step.

Amanda Hixson is a Cupertino, Calif.-based consultant and freelance writer.

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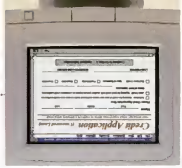

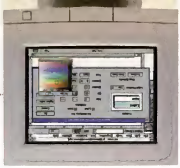

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HANDS ON

Where the rubber meets the road

Once around the block with a beta release of Windows NT

By Jim Canning

After the pundits take their shots at Windows NT, how will the front line handle this new operating system? A quick spin with a beta version of Windows NT reveals that users, network managers, developers, and support professionals who have to live with NT may like what they find.

To get an early, first-hand experience with Windows NT, I obtained a copy of the March 1993 beta version. I had planned to use my test machine, thinking that 8MB of RAM would do the trick. But when I received the documentation and read that the March beta still wanted 12MB, I bit the bullet and installed it on my "production" machine (486/33 with 20MB of RAM), which I try to reserve for mission-critical work (such as getting stories in on time). I've regretted similar experiments—including installation of several versions of OS/2—but things worked out quite well.

INSTALLING WINDOWS NT AND TESTING ITS LIMITS. Microsoft distributes Windows NT on CD-ROM; installing NT any other way (other than via a network) would be ridiculous. With no coaxing on my part, Windows NT recognized my Adaptec SCSI adapter and CD-ROM drive, found Windows and asked me whether I wished to upgrade it or install in a new location, and then went about its business.

My only installation problem involved a shared COM-port incompatibility: my Intel Satisfaxtion board was running as COM 3 under DOS/Windows, but Windows NT doesn't allow sharing. The result was no mouse, until I removed the Intel board. I was able to run CompuServe's WINCIM program using an external modem, however.

The next step was to start using my standard set of 16-bit Windows applications. I was able to run simultaneously two copies of Excel, one of Word for Windows, ToolBook, File Manager, Multimedia Viewer, Program Manager, and the NT Performance Monitor with essentially no performance penalty.

Despite processor time being "pegged" on Performance Monitor, there is no noticeable lag within Word, or when switching between applications. Windows under DOS would choke under this load. Certain functions, such as animations written in ToolBook, run faster than under Windows; others seem to run slower. Bear in mind, though, that these comments refer to the March beta, not the production version, and that 32-bit applications have yet to be written.

For command-line fanatics, the DOS window offers some pleasant surprises. The MS-DOS prompt launches any application within any of the subsystems (including character-based OS/2 applications). I launched Excel by typing "start excel."

I installed an Orchid Fahrenheit 1280 graphics accelerator to compare the process with that of Windows 3.1. Without consulting the manual or on-line help, I successfully ran Setup to change drivers, and rebooted to a 1024-by-768 display. Although the accelerated graphics provided a great improvement in performance, some screen-redrawing problems persisted. This was not a serious problem, and shouldn't be in the production release.

Be aware that all hardware drivers for Windows NT are quite different from those for Windows 3.1; you may have to wait a while until your video-board vendor supplies drivers for NT. Overall, system video performance still lags behind DOS/Windows, but not by much.

ANDREA KELLEY

NETWORK INSTALLATION. The final step was network installation. First, I installed Windows NT on two additional systems, then went back and added 3Com EtherLink II/16 NICs to each. The installation went smoothly, but the network wouldn't start after rebooting. Microsoft suggested I reinstall Windows NT with the NIC installed; sure enough, NT recognized the board and installed all the correct pieces automatically.

While it would have been nice to retrofit the system, it was so pleasant to have a network install proceed automatically that I forgave Microsoft right away. File sharing, Chat, Mail, and Schedule+ all ran as advertised.

SUPPORT FOR SYSTEM MANAGEMENT. Despite its ease of use, Windows NT allows control-oriented MISers to make a system safe from its user. Windows NT's Access Control Lists and transaction logging make management of critical data and functions manageable. Managers can adjust permissions and access rights over the network, as well, and allow the user to personalize his desktop. Users get to keep the feeling that their PCs are just that — theirs. Having worked with defense contractors, I was concerned about security issues such as accidental publishing of a disk or directory, but found that only "Administrator" or "Power User" class accounts could share a Windows NT volume.

Administration of Windows NT workstations, while more complex than DOS-based PCs, should prove a pleasant experience, since "accidental" user-induced problems should occur infrequently. Windows NT controls access to functions such as disk administration and maintenance. No more "I wonder what this FORMAT command does?" An administrative-level account and password restrict access to hard drive operations such as partitioning. When the NT File System (NTFS) is in use, the administrator may lock access to files and directories not needed by the user.

I had Windows NT convert an existing file allocation table (FAT) partition to NTFS to test this out, and had no problems. Nevertheless, a system as full-featured as Windows NT doesn't belong in the hands of a novice user.

Perhaps the best news of all — Windows NT is a network administrator's dream-come-true. I added TCP/IP to the default NetBEUI protocol simply by running the Network applet within Control Panel and choosing it from the list of available protocols — no memory-management issues, no conflicts, no muss, no fuss. And not having to pay extra for TCP/IP and its utilities makes Windows NT an even greater value.

END-USER CONFIGURATION AND CONTROL. For anyone experienced in network management, the issues around end-user configuration and control are of great interest. Dealing with modifications to individual configurations is an expensive proposition, especially when the network manager must visit the client to make changes. Microsoft, itself the owner of an extensive network of clients and servers, apparently is well aware of this problem and has addressed it in NT.

Managers of existing Windows installations needn't worry about having to rebuild a user's desktop when upgrading. Windows NT reads existing configuration files and uses them if desired. Shells for Netware, Network File Service (NFS), Pathworks, LAN Manager, and Banyan Vines should all be available soon, if not already. The NT Program Manager interface should look nearly identical to the old one, except for a few new icons.

THE IN-HOUSE DEVELOPER ANGLE. The news for potential Windows NT software developers is all good. First off, DOS is gone. Also missing (thank goodness) are segmented memory and the associated hoops through which code must jump to work with memory objects larger than 64KB. Windows NT closes the loopholes that allow developers direct access to hardware under DOS and Windows.

For experienced Windows developers, the environment shouldn't prove difficult to adjust to, since it is, after all, still Windows. Unfortunately, there is little new in Windows NT to improve bit-map graphics handling and performance. Vector graphics have improved quite a bit, but Windows NT is well behind the RISC platforms and the Macintosh in terms of color.

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INTERVIEW

Aiming for the high end

An interview with Paul Thacher, Microsoft's Windows NT product manager

BY AMANDA HIXSON

What's Microsoft's philosophy about quality control with Windows NT? How did Microsoft incorporate beta feedback into the development process? How does Microsoft define "mission critical" vis-à-vis NT? In this interview with consultant Amanda Hixson, David Thacher, Microsoft's group product manager for Windows NT, shares Microsoft's approach to developing NT and the company's expectations about customer acceptance.

InfoWorld: In ten words or less, what is the goal of Windows NT?

Thacher: The goal of Windows NT is to develop and deliver a new high-end member of the Windows operating system that brings the advantage of Windows to technical workstations, business workstations, and business servers.

InfoWorld: How well do you think you can achieve that goal?

Thacher: Clearly, it's the customer who will decide that. To date, the 60,00-plus users of Windows NT — of the software developer kit and the beta [release] — are telling us that we have delivered a system that delivers the power, reliability, and security that they're used to having from the high-end, married to the advantages of Windows. Right now we're feeling very good, based on the feedback we're getting.

InfoWorld: What are the hardest things about software development? Have you done different things with NT?

Thacher: We've done some things that are fundamentally different from what we've done before, and some things are in line with what we've done before that worked very well for us. One difference with Windows NT is we've brought in a very experienced, high-end development team — [starting with] Dave Cutler from Digital, where he designed the VMS operating system and several other operating systems. We merged [Dave's team] with the core group of our top developers. Over time, that group has grown from 40 to close to 250. But we started with a team that knew what it meant to deliver high-end, business-critical operating systems.

We then used a different design methodology, a methodology we've used in some of our application groups but not on the systems side — designing for checkpoints, where each checkpoint would treat the product as if it were a product release. At the first software developer's kit — which we called the preliminary software developer's kit and released back in the fall of '91 — we treated it as a final release and worked out all the known bugs and solidified the code. So when it was shipped out to developers, it was a very solid product. It wasn't feature-complete yet, but what was there was very solid.

Again, as we went to the main software developer's kit at the developer's conference in July of '92, we took it up to release quality. We did that again for first beta, and now as we shift to second beta we've completed the functionality and feel that it is a very solid system. This methodology really allowed us to [have] quality assured at every checkpoint.

InfoWorld: What did you do to insure the quality? How did you design the quality in?

Thacher: One of the ways you can do operating system design is to keep adding functions, testing different features and all, but don't do your serious stress-testing until the final part of the process. In fact what we've done with Windows NT is quite different: Build the core as you add components and [continually] stress-test the system. We really went through heavy-duty testing all the way along the track.

Finally, we follow the model that we've evolved with the Windows product line and with MS-DOS 5 of [involving developers in] huge external tests, beta testing, and developer testing. We're already passed 60,000 sites worldwide and will be out to 75,000 to 100,000 sites by the time we ship.

InfoWorld: What kind of feedback from developers has there been? What's missing?

Thacher: Fundamentally, our feedback from developers has been very positive. We've received very good reviews in terms of system completeness and stability, and the services the operating system provides. What differentiates Windows NT from many other operating systems is just how much is provided by the operating system, and how much we've done for our developers. If people are asking for more things, they're asking for us to deliver it yesterday. They're also asking us to give it away. I don't think there's really any major area that people have been asking for that's really not in the product.

InfoWorld: Microsoft isn't pushing Windows NT development per se, but instead Win32s or Win32 development. What's driving that?

Thacher: One thing to understand about Windows NT is that it is very much part of the same family of operating systems as the business standard — which today is Windows. Sixty-plus percent of all machines are shipping with Windows today — well over a million a month. It's the business standard. With Windows NT, we extend the Windows family in a compatible way: same user interface, same development environment, same applications.

Windows NT is designed for the high end and we expect it to [account for] ten to twenty percent of the Windows systems [sold]. The majority will remain Windows 3.1 and Windows for Workgroups and [new versions] of those products. If you have mission-critical desktop requirements, if you have technical workstation requirements, or if you have business server requirements, that's where Windows NT really comes into play — it's a different market from the general-purpose, personal productivity space.

InfoWorld: Define "mission-critical" or "business-critical."

Thacher: There is no clear definition. We default to allowing [a] corporate task force to define it because there are too many definitions. The bottom line is always: Mission-critical is the application that a corporation feels they must have up and running for their business success. It really depends on the company.

InfoWorld: Is there a performance hit because of all the added security and checking that goes on within the system?

Thacher: Well, we certainly put a tremendous amount of effort — with Dave Cutler, for example, focusing his efforts on the kernel to make sure scheduling is very efficient, and the other top team focusing on other areas of critical performance — into making sure that, as a general-purpose desktop and high-end business platform, [NT] does give you great performance.

But, there certainly is that overhead, and it's a choice we made — a very conscious choice. With Windows NT, we made a tradeoff. We felt the requirement we received from our customers was to design a high-end operating system and make sure that the right feature set was there. That was more important than making sure it ran on every system that is installed today. NT is not designed for laptops or personal digital assistants. It requires high-end hardware, more RAM, and more disk space. And when you add that hardware in, you do get better performance; you get the performance that you'd have with the base operating systems, Windows 3.1, etc.

InfoWorld: In other words, there is a performance hit, but it's not something that will matter to the market.

Thacher: In fact, user perceptions [of the beta] are often that it's a faster system than other systems they've used. The reason for that is simply that it's very responsive.

InfoWorld: The system is highly dedicated to security, authentication, and all kinds of things to protect all the processes from each other. What drove that part of the development and design?

Thacher: It has to do with memory protection and with built-in security, both to protect data and to protect the state of the machine to make sure that nobody reconfigures or otherwise unintentionally brings the system down. The main three requirements we thought we had to meet to deliver systems that our customers would want to use for their mission-critical business computers were: It had to be powerful, reliable, [and] open.

Power we get from 32-bit operations, from running on multiple-processor hardware, and from having huge capacities built into the system. Reliability's a critical issue. If you're thinking about putting your company's future on this

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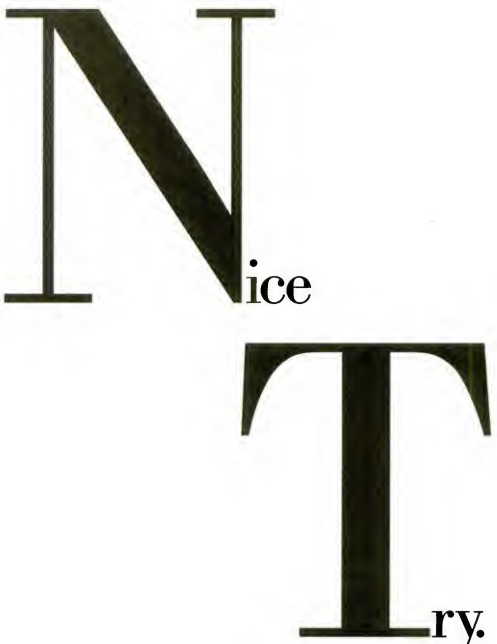
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INTERVIEW

Continued from page S92

platform, as our customers are, the internal architecture [must be] designed to let them run their systems with high confidence. So we put a huge emphasis on that.

InfoWorld: Along those lines, one of the things that jumps out when you read a lot of NT material is that you wrote certain subsystems for the product. One of those is Posix. Putting that together with

> **"We expect NT to account for ten to twenty percent of the Windows systems sold."**

the security aspect of it, this says "government" to me in a big way. Is that a direction you are pushing?

Thacher: Sure. We do a tremendous amount of business with the U.S., European, Asian, North American, and South American governments today. We have very large business relationships with these customers, primarily because they are very large computer users. So, yes — the Posix requirement, the security requirement, and the open networking are things that are required by the U.S. government, the European Community, and others. And it was certainly part of our design goal to make sure that we delivered a system that gave them what they needed.

InfoWorld: With the response that you're apparently getting from Unix vendors — i.e., their high interest in porting applications to NT — will that change your strategy around Posix? Do you think it will change the industry strategy around Posix compliance? Isn't it primarily Unix-"lite," a government checkoff item?

Thacher: Certainly, you can look at the Posix capabilities we've built into Windows NT and the cynical answer is that it's there to meet a government checkoff requirement. It does meet that requirement, but it's actually much more. I think of Posix [as] more than just Unix-"lite." (In fact, I've never heard it referred to as that.) I think of Posix as being the system structures and fundamentals you need to build a Unix subsystem.

Our goal was to lay down that foundation so it's available for third parties who wish to extend it and make it a more complete environment, primarily for corporations that have Posix-oriented or Unix-oriented applications that they'd like to run in a Windows NT environment, side by side, and integrated with, their 32-bit Windows or existing DOS and Windows applications.

Our goal there, for both government and business users (to the extent that they care about Posix), is to lay down that foundation for the future, not [to have] just a checkoff. In fact, we put a tremendous amount of work into that subsystem.

InfoWorld: Now that you're targeting a broader range of business customers, how important are OEM relationships, and what can you say about how you're going to be dealing with them?

Thacher: We have great OEM relationships. How well we've been able to work with system providers has always been one of the contributors to our success with our operating systems. So we'll continue to do that with Windows NT. You'll see Windows NT distributed as Windows is — as an OEM product as well as a retail product.

I think in terms of distribution, though, the most important place we're focused is not so much the regular retail or even the OEM channel. Those are important, but we're really focused on the high-end VAR or system integrators, and the additional services they can bring to the total solution. When you're talking about running a company on a Windows NT system, most companies will look to an outside integrator or VAR to assist them in that. So we're working with all the leading systems houses and the leading vertical-application vendors to make sure that they're ready to go with their products and their services on Windows NT when we launch the product.

InfoWorld: I would imagine that if you're going after the VAR market, there's going to be a lot of discussion about the service and support aspect.

Thacher: Well, we have a huge support organization at Microsoft already dedicated to customer support. I think one in five of our employees is in a support function. What we're doing with Windows NT is what we call a "solution-provider channel," which is making sure that we do give them [VARs] a preferential level of support.

We give them access to our training materials, access to our technical information services, and access to our top

> **"At best, our competitors will have some emulation services, and the majority of them don't even do that very well."**

support professionals, so that they in turn can offer their integrated support and service offerings to our customers. We have been delivering [both here and abroad] a set of training courses and training materials to VARs and solution providers — intense technical, integration, installation, service, development-oriented training.

InfoWorld: Is the initial training something that Microsoft is doing gratis?

Thacher: We charged something to defray some of the costs, but basically we were not by any means covering total cost. The goal is to deliver to these people both the training for themselves and a tremendous set of materials — presentation materials, backup materials, videotapes, etc. — that they can use to roll out their own services, train their support technicians, and do consulting for and education of their customers.

InfoWorld: What kind of relationship do you think you're developing or have developed with other network vendors vying for this whole thing? This could be perceived as threatening to some.

Thacher: Right. We've been in the networking business since 1985. It's a $100 million per year business for us. There are 5 million systems connected with our networking software worldwide today. And I've got to say that, in working with the other vendors, we're working very well with them, despite what one reads sometimes. Clearly, with Windows NT, though, and with the Windows for Workgroups product being released late last year, we're stepping into a new era. Our fundamental belief is that the days of the PC as a stand-alone system are passing quickly. We basically see that, in the '90s, systems will be connected. We think the operating system just has to be network-aware.

I think we've done very well to design a network operating system, an operating system that makes it easy for users to access network functionality, and makes it easy for developers to develop applications ready for distributed computing or workgroup computing — and yet at the core has a very open networking architecture that allows different network suppliers and their protocols to be plugged in.

Novell has announced that NetWare software will be ready when we ship. Banyan has announced that they are accelerating their development to try to get their support ready in time. SunSelect has in effect announced support for Windows NT. Digital has announced PATHworks support for Windows NT. A number of other vendors have announced TCP/IP and NFS support for Windows NT. We've announced a SNA product connecting to IBM SNA environments. We designed the system to be open. It's critical to us that it be a well-connected system, and we've put a lot of time and effort there.

InfoWorld: One of the things that kind of comes across much of the material about Windows NT is that it's the panacea for everything. How realistic is all this from your point of view?

Thacher: In fact, we think NT is very important. It will be a major step forward in our product suite, opening up Windows computing to much more high-end applications and providing a foundation for some very important advances that we'll be able to deliver over the next few years. On the other hand, though, the importance of Windows NT has, to some extent, been blown out of proportions that are unrealistic. It will be, I think, a very, very powerful competitor for high-end desktops and servers running business applications. It is important to understand that it will neither take over the world nor wash your car.

InfoWorld: If you were going to sit down and put lists of OSs on the wall, saying these are our desktop competitors and these are our high-end competitors, what would those two lists look like?

Thacher: On the desktop, clearly the mainstream desktop is Windows 3.1, and I don't think there is anything seriously rivaling Windows 3.1 today. Its role as the standard for business computing is fairly well established. For the high-end desktop — the business workstations and technical workstations — which is where Windows NT fits, the competition would be OS/2 or some Unix varieties. On the server side, for the business application server, I'd say Unix is the primary competitor, and that's really appropriate for us to look at as the competition.

InfoWorld: What about Mach and NeXT and their commitment to OSs vs. hardware — do you see anything real there in terms of competition?

Thacher: No. From our perspective, neither NeXT nor any of the other Unix vendors, nor OS/2 delivers the fundamental advantages of Windows NT: The ability to deliver high-end, operating-system functionality, support high-end business applications and technical applications, and do so totally integrated with the Windows environment. At best, [our

> **"Windows NT will neither take over the world nor wash your car."**

competitors will] have some emulation services, and the majority of them don't even do that very well.

InfoWorld: Do you expect to roll out updates to NT in shorter time frames or are you looking at some major releases?

Thacher: We'll have some near-term upgrades, and then we'll have some longer-term major upgrades. Near term, one of the most important things we're doing is a worldwide product release. Our first release will be in six languages: English, French, German, Spanish, Swedish, and Italian.

Within four to six months, we'll bring out a Kanji version and, after that, additional Far East double-byte versions. As part of that, we will roll out some minor changes we want to make in the software that will bring us an upgrade at that point as we go to the double-byte character sets (required for Japanese or Chinese characters, for example).

Longer term we have some major projects underway to incorporate completely distributed, object-oriented environments and development methodology on the Windows NT platform.

InfoWorld: What's your general pricing strategy?

Thacher: The same philosophy that drove Bill Gates to start the company in 1975 is driving us as we think about Windows NT. Our model is to stick with what's consistent out there in the PC and PC-networking environments, and not try to raise prices hugely.

Our approach to the entire PC software arena has been volume. Driving volume is really the one overriding thing about this business. As you can make it easier and easier for people to implement more and more systems, you increase the usage of PC-based systems and you increase their value to the corporation. Ultimately, lower pricing helps deliver greater volume, and helps fuel and continue to fuel the whole PC phenomenon. We'll play in that game.

Introducing Version 2.1

Not just up and coming.

No doubt, you've heard the hype about the long overdue first release of Windows NT,™ reportedly due to be shipped sometime this summer.

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POINT/COUNTERPOINT

Microsoft on the advantages of Windows NT

The newest and most sophisticated member of a scalable operating system family

POINT

Paul Maritz
Senior Vice President
Microsoft Corp.
Redmond, WA.

Windows NT is part of Microsoft's big-picture operating system plan, a strategy which intends to span the universe from sub-notebook devices to multiprocessor systems. Paul Maritz explains how NT fits in and how Microsoft hopes its customers will benefit from scalability.

Microprocessor technology is now used in increasingly diverse types of devices: from office equipment, hand-held devices and portable computers, to very powerful server machines that are mainframes in all but name.

Organizations now can look to microprocessor-based machines not only to supply personal productivity needs, but also to address the needs of line-of-business applications. This underlying power can, however, make things more complicated for users.

How many user interfaces will end-users need to learn? How many different programming interfaces will developers have to address? How many different administrative structures will system management and support staff have to learn?

Given the very large industry investment in and around the Microsoft Windows operating system, it makes sense to try to preserve and leverage as much of this investment as possible. And building upon the Windows base is something that no other operating system vendor can offer to its customers.

To address this challenge, Microsoft has been expanding Windows out from being a single product to becoming a family of products — in which each member has a specialized implementation, but is complementary to the other family members.

SCALABILITY. Our strategy for Windows is to develop a completely scalable operating system family, spanning computers from pen devices to notebooks, desktop machines, high-end workstations, even servers and multiprocessors. This family approach — with a common user interface and programming model — brings real benefits across the board.

Software developers can save time and money that they might otherwise spend rewriting applications for each new platform; they can come to market faster and at lower cost.

MIS managers, administrators, and other support personnel benefit too. Since training, not hardware, is the largest cost in most computer system installations, a single operating-system family can reduce costs for years to come — it simplifies and improves administration, leverages mini and mainframe legacy systems, and eliminates the expense and headaches of changing over to new platforms.

End-users benefit most of all. They can use an application once on one platform (for example, their desktop), and know it will operate the same way on another platform (a pen-based sub-notebook). This can save time and money, and can also boost productivity and effectiveness.

Microsoft's strategy includes a range of solutions, including Windows 3.1 for mid-range and stand-alone PCs, Windows for Workgroups for networked workgroup computing, and, last but not least, Windows NT for powerful PCs, workstations, and large organizational networks. To fulfill its place in this comprehensive strategy, Windows NT has been developed to be the most powerful, reliable, and open system for client/server computing.

POWER TO THE PEOPLE. Creating a powerful client/server operating system is our first criterion. "Power" means users can get more complex work done more quickly. The Windows NT operating system delivers that power through the same Windows interface and technology — such as Object Linking and Embedding (OLE) and Dynamic Data Exchange (DDE) — already endorsed by 25 million users of Windows.

No other system starts with that powerful advantage. But we build on it with the Win32 application programming interface (API), a flexible-grained, up, 32-bit programming interface for new application development.

The Win32 API makes advanced operating system capabilities available to applications through features such as multithreaded processes, synchronization, security, I/O, and object management. That makes Windows NT a great client/server solution and can make you more productive by running more numerous and powerful applications at once — without having to wait for the system to catch up.

Because Windows NT is a true, 32-bit operating system, it lacks any internal, architectural limits to power and performance. For example, it does not make assumptions about application data structures that can leave you "out of system resources" when you need them most for client/server computing.

PLATFORM INDEPENDENCE. "Power" also means being able to run on the most powerful hardware. In contrast to most operating systems, Windows NT is platform-independent and scalable, running on a range of processors, from Intel X86 chips and RISC chips from MIPS Computer Systems Inc. and Digital Equipment Corp. to a dozen symmetric multiprocessing systems. Windows NT supports more than 800 computer platforms and all popular video display modes.

Power also comes from having the most comprehensive set of features and utilities already integrated into your environment, including integrated networking, administration, fault-tolerant components, and advanced memory management.

REMOTE ADMINISTRATION. Microsoft designed Windows NT specifically to include remote administration and management features that MIS managers need for their corporate computing environments. Installation is virtually automatic; a set-up feature detects and configures to installed hardware, including network adapters, and automatically migrates information from previously installed versions of Windows 3.1. With Windows NT, managers can load or unload device drivers without bringing down the system for rebooting.

Managing and troubleshooting system performance are just as easy. Windows NT includes graphical tools to manage user accounts, monitor and diagnose performance, handle tape backup, and provide anti-virus protection. Managers can protect users from inadvertently deleting key system information, reconfiguring the system, or otherwise bringing it down. The same toolset can be used for remote system management, further simplifying the management process.

MISSION-CRITICAL RELIABILITY. Reliability is our second main operating-system criterion. Reliability and security have been designed into the system, not added on as a layer afterwards, and the hardware helps ensure that the resulting system is also fast and efficient.

A range of features — from uninterrupted power supply to the new Windows NT File System — minimizes the chance of hardware failure and helps ensure fast recovery from any exceptional failures that do occur. Additional features — including protected subsystems, virtual memory, memory protection, and hardware isolation — keep the client/server system running even if isolated applications fail.

When a client/server solution can access data and applications from throughout the system, reliability also requires strict security measures. Windows NT provides comprehensive security, and is in the process of being evaluated for a C2 security rating, to guard against inadvertent or malicious tampering.

OPEN ARCHITECTURE. Openness is the third strategic criterion for an advanced operating system. "Openness" means client/server solutions interoperate with existing networks, and offer freedom and flexibility in building enterprisewide, even global, server systems.

Windows NT makes this possible through its interoperability with, and support for, a broad array of standards. It has built-in support for multiprotocol networking, including TCP/IP, NetBEUI, IPX/SPX, and DLC.

It can be extended to support the important networks, including Systems Network Architecture (SNA), LAN Manager, NetWare, Network File Service (NFS), Banyan VINES, and AppleTalk.

Windows NT also supports distributed computing standards, including Windows Sockets, Named Pipes and OSF DCE-compatible Remote Procedure Calls (RPC's). This combined support allows access to information on different hosts and databases throughout a network.

Openness also creates lots of options in terms of application availability. Users can choose to run 32-bit applications for Windows, any of the 5,000-plus existing 16-bit applications for Windows, as well as character-mode applications for MS-DOS, Posix, and OS/2.

SUPPORT CONTINUES TO GROW. Understandably, industry participants share our enthusiasm for Windows NT. Independent software vendors will have more than 500 32-bit applications for Windows NT ready for release this year, and have another 1,500 under development. Hundreds of platforms already run the system. Hundreds of value-added retailers (VARs) and systems integrators are already implementing programs to deliver Windows NT-based business solutions.

Windows NT was designed to be the most powerful, open, and reliable operating system for client/server computing, but it was also designed to be a key member of the Windows family. It is part of a comprehensive, coordinated, scalable family supporting the broadest range of platforms and users. Customers can be assured that as the Windows family and applications evolve, Windows NT will be a key part of this evolution.

POINT/COUNTERPOINT

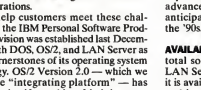
IBM on the advantages of OS/2

Exploiting the performance of 32-bit PCs and offering client/server solutions

IBM is focusing on OS/2 as its "integrating platform" for customers obliged to revamp their existing information systems. Unlike Windows NT, OS/2 has proven market maturity and a jump on object-oriented interfaces. Like Microsoft, though, IBM is also concerned with future technologies and Windows compatibility.

Businesses of every size are facing major challenges today, from ever-increasing competition to rapid changes in work force demographics, and many of them are seeking to re-engineer their information systems to achieve the advantages of client/server operations.

To help customers meet these challenges, the IBM Personal Software Products division was established last December with DOS, OS/2, and LAN Server as the cornerstones of its operating system strategy. OS/2 Version 2.0 — which we call the "integrating platform" — has proven itself capable of helping customers in their re-engineering process by providing a stable, robust, and mature



platform on which to build their client/server operations.

In fact OS/2 was designed for client/server computing. But that's only one way it is designed to help businesses increase productivity.

MORE THAN 2 MILLION SOLD. More than 2 million copies of OS/2 2.0 were shipped in the first nine months after its introduction. Over the last year, computer industry magazines have given it a dozen awards for technical excellence.

OS/2 2.0 is the first mainstream, 32-bit platform for Intel-based PCs, enabling end-users to exploit the performance capabilities of 32-bit PCs, while allowing them to run their existing applications.

With its 32-bit architecture, OS/2 provides preemptive multitasking, multithreading, strong protection between applications, and massive memory support. It comes with DOS and Windows built into it, allowing users to run tens of thousands of applications — the widest range of software applications that can be run on any Intel-based operating system.

IBM has been providing this support for more than a year now, while the competition speaks of a future time when this will be possible on their systems. Protecting customers' investments in software, while enabling them to take advantage of new application developments, remains a high priority for us. Our track record proves this.

Through its support for networking, OS/2 allows DOS, Windows, and OS/2 clients to access PC, midrange, and mainframe servers. In addition, OS/2 LAN Server, along with management tools such as the LAN NetView family of products, extends OS/2's role as a premiere client/server platform.

Furthermore, OS/2 serves as an advanced foundation on which to build solutions that directly address databases anywhere, and also provides a powerful base for 32-bit applications exploiting the capabilities of the most advanced hardware available now or anticipated throughout the decade of the '90s.

AVAILABLE TODAY. The best part of the total solution provided by OS/2 with LAN Server and LAN NetView is that it is available and fully supported today and has a large base of satisfied customers.

Today, OS/2 Version 2.0 provides the maturity and market-tested reliability that is demanded of a client/server platform. It also offers leading-edge technology, such as the object-oriented graphical user interface — the Workplace Shell.

The Workplace Shell, OS/2's object-oriented, graphical drag-and-drop user interface, offers outstanding ease-of-use so users can concentrate on what they want to do — increase their personal productivity — rather than on how they need to do it. The Workplace Shell allows users to organize their data objects, program objects, template objects, and folder objects as they would like to, while providing access to 32-bit applications technology.

THE LAN SERVER ADVANTAGE. LAN Server 3.0, which runs on OS/2, is the fastest network server in the PC marketplace, and provides powerful services such as file, print, and device sharing to DOS, Windows, OS/2, and Macintosh clients. In addition, LAN Server provides the capability for NetWare and LAN Server clients to coexist on the same workstation sharing a single network adapter card.

The LAN NetView family of products will provide advanced software-configuration management, system performance evaluation, effective fault management, and local or remote management of the LAN system.

A BETTER ENVIRONMENT. In general, OS/2 Version 2.0 improves the native environments for DOS, Windows, and OS/2. It adds memory, multitasking, and application integration to the DOS environment.

For example, it is now possible to cut-and-paste between DOS applications while running them on OS/2, even though the application was not originally designed with cut-and-paste functionality. It runs nearly all Windows applications while exploiting memory support, multitasking, and OS/2 reliability.

OS/2's industrial-strength design, reliability, and powerful multitasking capabilities also provide the best system for a connected environment and distributed processing. OS/2 applications support productive client/server operations.

Communications Manager/2 Version 1 brings the application and communication resources of large networks to the end-user's fingertips. DATABASE 2 OS/2 (DB2/2) provides a leading, proven relational-database management system for end-users in a client/server environment.

From a developer's point of view, the environment is robust and the platform provides an array of programming tools, the System Object Model for object-oriented programming, and the ability to enable LAN, pen, and multimedia technologies. Its 32-bit application programming interfaces (APIs) allow developers to create more sophisticated applications now and to prepare for future developments. Developers worldwide have made OS/2 2.0 a platform of choice for creating OS/2, DOS, and Windows applications.

Furthermore, the design of OS/2 protects existing investments while providing flexibility for future growth. It is designed to serve as a foundation for developments in the years ahead — advances such as object-oriented systems, an enhanced distributed computing environment, and portability across different processors.

WATCH FOR OS/2 VERSION 2.1. By the middle of this year, we expect to ship Version 2.1 with a host of enhancements, including a new, 32-bit graphics engine. With the enhancements, users will have more improved performance, and they will be able to launch OS/2 and most DOS applications from within a Windows application, and run standard-mode as well as enhanced-mode Windows 3.1 applications.

OS/2 Version 2.1 will include a new 32-bit graphics engine, improved performance, and enhanced Windows support.

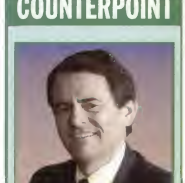
The new release also will provide enhanced enabling code for pen-based systems and multimedia applications, and advanced power management support for extended battery life in portables. Multimedia Presentation Manager/2, providing advanced multimedia technology, also will be included with the new release. OS/2's advanced, true multitasking makes it ideal for multimedia applications.

Besides multimedia, OS/2 is uniquely poised to exploit two major technology trends in the industry — decreasing cost of memory and increasing processing power — opening the way to more efficient, advanced applications. Development of the 16-MB dynamic RAM (DRAM) chip will provide memory in increasingly larger units.

Chips with increased processing power are gaining significantly wider use in the market, with 32-bit processors now dominating PC shipments. Lower-cost memory and greater processing power enhance PC versatility and open the door to the most advanced applications.

OS/2 today has the power and the facilities to meet the increasing demands of PC systems throughout the '90s. With this power, businesses can capitalize on the greater efficiency and flexibility of client/server operations and advanced applications to boost operating efficiencies, productivity, and customer service.

COUNTERPOINT



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CASE STUDY

Nordstrom takes a chance with Windows NT

Multiprocessing, remote administration were key attractions

BY ALICE LAPLANTE

Nordstrom Inc. seems at first glance an unlikely Windows NT pioneer. Yet the Seattle-based chain — held up by Wall Street as the penultimate leader in retail customer service — is rolling out ambitious, enterprise database applications dependent on this leading-edge technology.

Nordstrom had previously achieved its reputation for stellar attention to customers with an IS infrastructure that has lagged other retailers. Most notably, Wal-Mart, K-Mart, and Toys-R-Us have all invested heavily in Open Systems, client/server technology, and distributed database architectures that provide the type of functionality Nordstrom is only now putting into place with three strategic client/server applications based on Windows NT and NCR multiprocessing systems.

A traditional IBM CICS shop, Nordstrom is still heavily dependent on its IBM 3090 mainframe, which performs virtually all operational and administrative processing for the retail chain. Currently, Nordstrom has 52 full-line stores, 16 "Rack" (or clearance) stores, 4 limited-service stores, and 11 shoe stores located in Hawaii's Liberty House department chain.

IS services are delivered to all remote stores and facilities via a dedicated Systems Network Architecture (SNA) network to standard IBM 3270 terminals, of which there are literally thousands spread throughout the company. More than 1,300 standalone PCs are used for word processing, spreadsheet, database, and other productivity applications.

But although a handful of LANs are scattered among departments in isolated departmental applications, Nordstrom had shied away from client/server technology until last June.

At that point Nordstrom installed an early pilot of its Merchandise Check Express application (see "Nordstrom pilots in-store tracking system," August 17, 1992, page S66), which allowed Windows-based remote PCs on Nordstrom shop floors to query a Gupta Technologies database using 3270 emulation over the SNA network and determine whether a particular item is in back-room stock or available at a nearby store.

This project was successful enough for Nordstrom to consider taking it a step further: Rather than limiting PC database access to what was possible via 3270 emulation, Nordstrom became interested in developing interactive applications in a fully graphical environment using distributed client/server architecture.

CRITICAL CUSTOMER SERVICE. Nordstrom first defined a series of strategic applications appropriate for a distributed computing architecture. These would enable real-time tracking of exactly what was being sold when and where within the Nordstrom chain, reconciling sales data with inventory information to better coordinate buying and shipping activities, and otherwise helping Nordstrom salespeople to offer better customer service.

Once these applications were defined, Nordstrom's technical architecture and systems services groups began investigating how to best implement them using a distributed LAN architecture.

One of Nordstrom's first realizations: It needed a hardware architecture in the individual stores that was scalable. Because different Nordstrom stores varied considerably in size and sales volume, the hardware platform needed to be economically expandable or contractible on a store-by-store basis.

Because this implied a multiprocessing solution, Nordstrom needed — logically enough — a multiprocessing operating environment. According to Larry Shaw, Nordstrom's PC coordinator, who said Nordstrom could choose between some flavor of Unix, or the as-yet-unfinished Windows NT operating system.

It was here that Nordstrom's very demanding support requirements pushed it firmly in the direction of Windows NT.

REMOTE SUPPORT CAPABILITIES. One of Nordstrom's chief concerns was how to provide support and service to this highly distributed new architecture. Not having the staff or the resources to physically place a LAN administrator in every retail store around the country, Nordstrom still needed a way to remotely diagnose and correct any problems that arose.

"Here is where [Windows] NT obviously shone," said Shaw. "NT has a fairly strong capability to monitor the performance of any NT server or workstation from a remote location," he said. Disk I/O utilization, networking I/O, and calculating which processes are using how much of machine resources can all be easily viewed by a remote Windows NT administrator. "You can see who is logged on, what files are being locked and shared, and in general what might be causing trouble," said Shaw.

This kind of capability was critical, given that a stated Nordstrom goal was to support all remote LANs from the Seattle data center without any significant increase in support headcount, according to Shaw.

Critical to this will be the "Hermes" piece of the Windows NT family of products, which has yet to be delivered by Microsoft. One of the few disappointments Shaw expressed with NT was that Hermes would not be available until later. Indeed, Microsoft has yet to announce an official ship date for Hermes.

A network system-management facility that provides remote capabilities not available in the base Windows NT product, Hermes will play a critical role in Nordstrom's distributed support strategy. Among the features Hermes promises: stronger remote management of Windows NT networks, software distribution capabilities, software metering for network applications, and workstation inventory scanning. This latter capability allows LAN administrators to maintain an automatically-updated database of all hardware and software products installed on any NT, DOS, or Windows machine attached to an NT server.

Hermes will also allow Nordstrom to assign Windows-based "program groups" to individual users or groups of users. This means whenever a Nordstrom employee logs onto the network — no matter if it's from his usual workstation or a different one — the specific set of applications and files he is used to working with will automatically appear.

When the Windows NT project is completed in early fall, every Nordstrom store will have an NT LAN of 33-MHz 486 workstations installed. These will be connected to the NCR 3360 server, which in turn will link back to Seattle headquarters via a FrameRelay network. With these systems in place, Nordstrom employees will be able to check inventory levels, spot trends, locate merchandise, and otherwise access up-to-the-minute sales and merchandise data.

At the data center, NCR multiprocessing servers — probably 3450 systems — will act as query-only data servers. Running Microsoft's SQL Server, these database servers will be updated on a daily basis from the DB2 database residing on the IBM 3090 host.

The first LANs were installed in Portland-area Nordstrom stores in late April; all stores will be connected by September, estimates Shaw.

The final architecture is by no means set in stone, however. For example, Nordstrom is reserving the option of moving to another SQL database engine in the future, should the Microsoft solution prove less than optimal. Also optional: substituting a more powerful server at the store level.

According to Shaw, Nordstrom would consider moving to a massively parallel solution, such as a Teradata server, should the heavy data-processing requirements of the applications require it. "We're talking about very large amounts of data — between 80 and 120 gigabytes," said Shaw. "We're aware that we may need to fine-tune the architecture as we go operational."

BRINGING STAFF UP TO SPEED. The Windows NT project has obviously caused a major paradigm shift within

See NORDSTROM, page S10

When the Windows NT project is completed, every Nordstrom store will have an NT LAN that will be supported remotely from Nordstrom's Seattle data center.

TECHNICAL

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the Unix model, in Windows NT improves on Unix by having a tiny unprotected kernel. Unix gets along with a larger unprotected kernel by virtue of having honed it for two dozen years. Unix grew up in the most hostile environment imaginable — the university system, where generations of young geniuses spent endless hours trying to cause system crashes. The fact that Unix still exists indicates that it is supremely robust.

In contrast to Windows NT and Unix, OS/2 and NetWare have large, monolithic kernels running in unprotected memory. OS/2 offers more practical protection than NetWare, and has more experience with protected-mode operation than Windows NT or NetWare. NetWare's millions of users testify to its robustness, although lack of protected-mode operation has in the past made NetWare vulnerable to rogue NetWare Loadable Modules (NLMs) from third parties.

NetWare 4.0's introduction of protected-memory domains makes it possible to test NLMs until they appear to be ready for prime time. Protected-memory domains extract a substantial performance penalty, so users have some encouragement to migrate NLMs to unprotected mode.

SECURITY. Efficient implementations of multiprocessing and security, areas where Windows NT is outstanding, probably require that they be incorporated into the initial design of the operating system. They don't work as well when they are glued on as mid-life kickers.

Windows NT doesn't have great Unix connectivity, but it has come not to accommodate Unix but to bury it.

Windows NT has built object-level security into the NT kernel.

All the other systems have layered security structures around their products on an ad hoc basis. Unix security frequently makes the news, which is not a good sign. Windows NT and Open Desktop offer C2-level security as part of the basic package. Solaris and UnixWare both offer C2-level security as an option. (C2-level security is necessary for some government contracts.) NetWare 4.0 has added powerful security auditing facilities. OS/2 offers a base level of security features, but is now in a catch-up position if it wants to stay abreast of its competitors in the area of security.

MANAGEABILITY. Windows NT Advanced Server overcomes many of the limitations of LAN Manager in meeting the needs of larger environments. The addition of trusted domain relationships and vastly improved management tools are major improvements for enterprise networks.

NetWare is ahead of the pack for enterprise management. NetWare's NetWare Directory Services (NDS) provides a global, distributed database that replaces the NetWare 3.1 bindery. NDS simplifies management of multiple servers and other resources spread across multiple sites. Windows NT Advanced Server does not offer the hierarchical depth of NetWare's NDS. IBM's LAN Server 3.0 includes domain-based management suitable for a small enterprise.

Solaris offers the enterprise-wide Network Information Service (NIS+) naming service that was recently licensed by SCO for Open Desktop. This logically hierarchical system is comparable to Windows NT's Trusted Domains. NetWare has also introduced some innovative storage management services, such as selective file compression, and a data migration system that takes advantage of hierarchical storage by moving files automatically from disk to optical storage to tape.

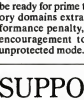
THE BOTTOM LINE. Microsoft expects Windows NT to sell a million copies in its first year. This should overcome the main objection made towards Windows NT—that it is too new to be trusted. If it meets its goal, within a year Windows NT will have sold as many licenses as Sun or SCO have sold in their entire histories. On a feature-by-feature basis, Windows NT stacks up well against all competitors. Windows NT doesn't have great Unix connectivity but, on the other hand, it has come not to accommodate Unix but to bury it. Windows NT doesn't offer the level of fault tolerance that Novell can provide, but it may offer more robustness.

Yet even with all its fancy features, Windows NT's real trump card is its Win32s API. Developers will likely jump at the chance to write programs that can be run on any Windows platform and at almost any level of performance. The number and quality of new 32-bit operating systems is truly an embarrassment of riches, since, like it or not, everybody is eventually going to have to choose sides.

Les Kent is president of Vision Network Systems, Inc., a network integrator based in Oakland, Calif. Mr. Kent is a frequent contributor to InfoWorld.

SUPPORT

Continued from page S84



wide range of independently written and published OS/2 reference materials are available. IBM's famous "red books," which contain technical tips and techniques about OS/2, and were formerly available only to internal IBM programmers and developers, will soon be available to the general public from Que Corp. Delivered via CD-ROM, these will contain formerly unpublished technical details on OS/2 for developers and support professionals.

IBM has come a long way since the early days of OS/2. Corporate developers who have received a runaround in the past now have a single point of contact at IBM. The toll-free 800 number is a big step forward, and the establishment of the Dallas center for corporate developers should aid corporations who have decided to make OS/2 the cornerstone of their client/server enterprise strategy.

SUNSOFT: EXPANDING PLATFORMS. SunSoft introduced its long-awaited update of the Solaris operating system at the end of March. Solaris now runs across both Sparc and Intel architecture machines, the first 32-bit operating system to do so seamlessly.

This opens up a whole new class of users for SunSoft to support, since Solaris will be distributed through traditional PC retail distribution channels, as well as Unix solutions providers.

Like Microsoft, SunSoft is funneling most customer-support activities to third-party providers. All customers are provided with 90 days of toll-free installation, configuration, and support help from 60 SunSoft technical experts. But after this 90 days expires, Solaris customers will need to sign a contract with one of Sunsoft's authorized service providers (ASPs).

As of press time, Sunsoft had announced only one ASP: the support and service arm of its parent company, Sun Microsystems Inc.'s Worldwide Customer Support organization. According to Walt Brown, director of support services for Sunsoft, 35 ASPs will be signed up by December. Critical for ASP certification is completion of a series of training courses in the Solaris operating environment.

Although Brown says these ASPs will be Solaris customers' primary source of support — i.e., customers will not be encouraged to call SunSoft directly — SunSoft is currently beta testing a CompuServe forum that would allow Solaris customers to directly access SunSoft technical representatives, as well as download bug notices and patches. SunSoft will also be certifying a number of Authorized Education Centers where corporate customers can take Solaris training classes.

Solaris customers currently have one support option after the initial 90 days expires: to contract with Sun's Worldwide Customer Support group for either one-time requests or on-going services. "Incident" help for one-time problem resolution costs $150 per hour for telephone support, with a minimum 2-hour charge. Sun also offers a Software Update Program that provides bug fixes, upgrades, and workarounds to the Solaris operating system, as they become available. This costs approximately $35 a month per desktop, or $70 per server. All updates are delivered via CD-ROM.

Sun's general Answerline Service is the unlimited toll-free support telephone service that costs approximately $35 a month per desktop, $70 per server. Personal Answerline service provides a dedicated Sun support representative for the corporate account. This costs a one-time charge of $335, plus an additional $35 monthly charge for each workstation, and $70 per server.

All these support services are available during business hours. For 24-hour, seven-day-a-week support coverage, there is a 40 percent surcharge.

According to Cindy Williams, Sun's worldwide marketing program manager for customer support, Sun has put enormous effort into making sure customer calls are answered promptly at the 24 Sun Solution Centers around the world — where the Answerline questions are fielded. More than 350 Unix experts wait for calls to be routed to them. Sun carefully tracks statistics to ensure that on-hold waiting doesn't exceed 20 seconds.

Sun also decided to change the traditional way that more complex technical questions are answered. Instead of having the telephone representative "log" the call, refer to the appropriate technology expert, and get back to the customer, Sun attempts to route the call directly to the expert.

A dedicated staff of 60 "escalation engineers" is reserved for those calls that require urgent attention, according to Jay Pederson, traditional services marketing manager for Sun. Said Williams, "That only happens at half a percentage of all our calls. But we want to be ready." Customers themselves decide the priority level of their problem.

SUPPORT TOOLS BY SUBSCRIPTION. Sun also makes its own internal support tools available to Solaris customers on a subscription basis. One such database, SunSolve, is Sun's on-line bug and solution database used by its internal support representatives. The "Help Desk" is a superset of the SunSolve database and includes a combination of procedures, reference materials, and software that helps an internal support organization track and escalate support calls. "Call Tracker" is a Unix-based software system for help desks also available from Sun's Worldwide Customer Support.

As of press time, Solaris for Intel X86 platforms had just started shipping. Pederson admitted there were going to be internal training challenges to bring Sun support representatives up to speed on the new architecture. "We're putting our Unix experts through intensive training to meet this challenge," he said.

SunSoft, like Microsoft, is betting that the third-party market will bear most of the burden of operating-system support. Thus, much of the quality of Solaris support will depend on the competence of SunSoft authorized service providers. The 90-day toll-free support direct from SunSoft experts is right on the money, as is the CompuServe forum that will provide electronic support services. But it remains to be seen how SunSoft will pull all the pieces together to adequately support its new class of customers.

WHICH STRATEGY WORKS? Time will tell if the different support strategies of these 32-bit OS vendors will satisfy ever-demanding corporate customers.

To Microsoft's credit, its acknowledgement that hands-on support of complex multivendor networks is beyond its capabilities is a welcome one in the overhyped PC industry. By focusing on where it has historically excelled — providing core technical help to application developers as well as tools that allow other IS professionals to help themselves — Microsoft may actually enhance its credibility in the eyes of the mainstream IS world. Many senior IS managers are openly skeptical about Microsoft's ability to deliver the quality of support they need. The fact that Microsoft is working to ensure that such support is available elsewhere — albeit at a price — may well reduce fears that Gates & Co. isn't yet ready to play in the major leagues of enterprise computing.

Alice LaPlante is a Palo Alto, Calif.-based freelance writer and a contributing editor to InfoWorld.

NORDSTROM

Continued from page $98

Nordstrom's IS division.

"When this project began, we were doing limited DB2 development; we had one person who knew how to program in Visual Basic; and we had lots of IMS data-analysis experts," said Shaw. SQL database and graphic user interface programming skills were virtually non-existent. Nordstrom pulled in IS people "from virtually every aspect of IS — from database processing, to operations, to programming and development," said Shaw.

In addition to putting team members through traditional classroom training, Nordstrom has also contracted with Microsoft Consulting Services. Depending on the day of the week, between three and six Microsoft NT experts are on-site at Nordstrom's Seattle data center, participating in all aspects of the project, from initial design to final testing.

This hands-on help plus the experience of working with the various beta versions since late 1992 has given Nordstrom a great deal of confidence. Said Shaw, "By the time we roll this application out in volume — which will be in late August — we expect Windows NT to be very reliable indeed."

To be on the safe side, Nordstrom had defined a number of "drop dead" dates for this project by which it expected Microsoft to deliver key Windows NT functionality. If Microsoft hadn't met those dates, Nordstrom was prepared to move ahead with alternative technologies. "But that hasn't happened thus far," said Shaw.

As one of the first corporate sites to bet heavily that Microsoft will keep its promise of delivering a sophisticated operating environment capable of supporting a mission-critical application, Nordstrom is obviously taking some risks on an as-yet-untried product. But Nordstrom is also in the position to reap substantial rewards. If these projects succeed, it should propel Nordstrom's already-legendary reputation for quality customer service even further ahead of its competitors.

Alice LaPlante is a contributing editor to InfoWorld.

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HANDS ON

Continued from page $91

The plethora of Windows-hosted software development tools that already make Windows a good platform for corporate application development should appear in an even brighter incarnation under Windows NT. Multiple threading and asynchronous I/O allow compiles to transpire concurrently with other functions. Group development projects should benefit from the rich set of file-sharing and access control options available with Windows NT.

Windows NT opens up some new vistas for in-house developers. One of the least-heralded aspects of Windows NT is its compatibility with OSF's Distributed Computing Environment (DCE). DCE is a set of remote procedure calls (RPCs) that allow computers on a network to invoke work on each other. Engineering, scientific, and creative applications need all the performance they can get — why not borrow some from idle nodes on the network, or from that multiprocessor Alpha machine running OSF/1 down the hall? There are still a few issues around Microsoft's implementation of DCE that need cleaning up, but they aren't show-stoppers.

WILL RAW CAPABILITY BALANCE NEWNESS? After limited testing, I'd have to say that Windows NT offers an excellent balance between capability, ease of use, and price. The only major problem with Windows NT is its newness — will 32-bit software and drivers appear quickly enough to cement market opinion in its favor? If early indications of third-party support hold true, Windows NT could see early success.

Most PCs in use today aren't ready for Windows NT, so don't think of NT as a replacement for existing DOS/Windows machines (wait for Windows 4.0 for that). Converting a late-model 486 to Windows NT shouldn't be too expensive, though. New Windows NT desktop PCs ought to sport a 486DX or RISC CPU, have Ethernet and SCSI support, 16+ MB of RAM, a high-resolution display, and lots of hard-disk space.

Switch people only when they understand what they are gaining and losing. Windows NT servers are scalable from desktop level to 500-MIPS monsters, depending on need. Only power users should get Windows NT for their desktop. After support personnel learn the basics, Windows NT ought to be easier to support than DOS/Windows.

Jim Canning is president of Stratos Systems in Sunnyvale, Calif., which specializes in multimedia software and design consulting. You can reach him on CompuServe at (72730,2733).

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Down to the Wire / Nicholas Petreley, Nancy Durlester, Laura Wonnacott

Our early foray into TCP/IP and NFS fails to register on our thrill-o-meter

After four weeks of intensive work with TCP/IP and Network File Service (NFS) products, installing and reinstalling drivers, testing and retesting VT-100 terminal emulation, and transferring and verifying files, we can sum up the entire product category in one word: boring.

Don't think we didn't give this a lot of thought. The word "frustrating" was tempting, considering how much time we spent on installation. (We are convinced TCP/IP really stands for This Can't Possibly Install Properly.) But the experience of frustration is not common to all products we tested. Boring is. This stuff is incredibly dull. It registers somewhere between sensory deprivation tank and coma on the Enterprise Team thrill-ometer. The only other time we have seen the needle sink lower was when we calibrated the bottom of the scale during an editorial meeting.

That's not to say the application of TCP/IP and NFS is as uninteresting. We are looking forward to tapping into the Internet, for example. The file transfer programs will come in handy to access support files and other goodies from one of the many anonymous File Transfer Protocol (FTP) sites on the Internet. An anonymous site, incidentally, is not a secret rendezvous. It's something like a BBS. You connect as an anonymous user to a remote host computer's file system to upload or download files. Like some bulletin boards, some anonymous FTP sites will not allow you to upload files.) The host is carefully configured to restrict the anonymous user's access to certain areas of the file system.

So the products will prove useful. But with only a rare exception here and there, the immediately tangible aspects of the products — the things that you can see and manipulate when you run the pro-

gram for the first time — are hopelessly bland.

WINDOWS DISINTEGRATION. All of the PC products let you attach a Unix directory on a remote host as a local drive in Windows File Manager, much like you would map a drive in NetWare. Some even let you pick among the directories that are available to you. You control access to these directories via the exports file, an administrator-defined text file that resides on the Unix machine.

Only two products, FTP Software Inc.'s PC/TCP Plus and Frontier Technologies Corp.'s Super-TCP, sink their hooks deep enough into Windows File Manager to give you the option to view the full extended Unix file names. Remember, DOS only has eight characters for a file name and three for the extension. And DOS always shouts — it only uses uppercase. Unix file names can more closely resemble English. Unix recognizes both upper and lowercase and lets you use file names long enough to identify a file or directory so that people will know what it is without too much guessing.

These products have to juggle both DOS and Unix file systems in Windows, so they generally solve the discrepancy in naming conventions by translating the Unix file names to the least common denominator, DOS. Depending on the algorithm they use, the translation you get can look like anything from a truncated version of the Unix name to something that resembles cuneiform.

That's why we were pleasantly surprised to see that Super-TCP and PC/TCP actually show you the full Unix names in Windows File Manager.

The problem is that we had PC/TCP installed on two machines and saw the full Unix file names on only one of them. Same product. Two machines. Two different results. And nobody remembered doing anything different on one than on the other.

SUPPORT RAPPORT. We were already on the phone with tech support when we noticed this, so we asked our phone friend why one PC was not showing long file names. He said that PC/TCP is not capable of presenting extended file names in Windows File Manager. We looked at each other, rubbed our eyes, and looked at the two screens again. The directory name **AnswerBook** looked like ANSWERBO.~~~~MC on the other with a tilde in there somewhere. Long. Short. What were we missing here? We ran it by tech support again, this time speaking more slowly. They put us on ignore (some phones label the button "hold").

In the next few moments we took wild guesses at what could be happening. Did we leave a stray driver from another product installed? Could drivers from other products even work with PC/TCP? We scraped together enough common sense between the three of us to come to the conclusion: no.

The techie returned to the phone, a little embarrassed, and admitted there was a configuration option to set File Manager to use long or short file names. We quickly perused the menus as directed. We popped up a dialog box, found and pressed the Options button, and up popped another dialog box. There it was. A check box labeled "Show Long." Hey, Rocky, watch us pull a long file name out of a hat. Nothing up our sleeves (we click on the check box and drop back into the File Manager). Presto. It looks exactly the same. No doubt about it, we have got to get another hat.

We unchecked it. No change. We tried the refresh command in File Manager. Nothing. We went back and forth several times, checking and unchecking. Other than discovering a new bobby, we were getting nowhere. We ran this by tech support again, lest this May project turn into a June foray (ouch).

This required a trip down the hall to speak with an engineer, so he promised to call us back. This PC is not perhaps the most experienced with the product, was at least honest, polite, and more than willing to help.

Within a few minutes he called as promised with the answer. The check box for short or extended file names changes a global variable that File Manager reads each time it starts up. In other words, to switch between long and short file names you check or uncheck "Long Names," exit File Manager, and then start File Manager again.

Gotta go. Time to recalibrate the thrill-o-meter.

Down to the Wire chronicles the ongoing adventures and misadventures of our InfoWorld IS task force, the Enterprise Team. E-mail can be sent via the Internet to nicholas_petreley@infoworld.com.

Help Desk / Brett Glass

Three ways you can share printers across LANs and WANs

Our LAN and WAN use TCP/IP. We want to set up a network laser printer that will be accessible to PCs on the LAN, a Unix box on our WAN, or our mainframe (also on the WAN). How can we do this?

Jim Case

A The least expensive way to set up a TCP/IP print server is to install print server software on one of your existing computers. Virtually all versions of Unix and most TCP/IP packages for DOS provide this feature. However, if you want a full-time, dedicated print server, there are several possibilities. First, you can set up an inexpensive PC clone (an old 286 should work nicely) as a print server by equipping it with TCP/IP software. Or, if you have a recent-vintage Hewlett-Packard LaserJet or ink-jet printer, you can buy a plug-in card that converts it into a TCP/IP print server. Products that do this include the Pacific DirectNet card, from Pacific Data Products ([619] 552-0980); the NetJet and NetQue cards from Emulex ([714] 241-0792); and the XJet III and XJet IV from XCd ([714] 476-7957). If you have a non-HP printer, check to see if the manufacturer offers its own TCP/IP plug-in option (many do). The most expensive solution is to buy a dedicated external print server — essentially a "print server in a box," which supports many brands of printers and can often bundle more than one printer at a time. Sources for external TCP/IP print servers include Digital Products ([617] 647-1234), Emulex, Nu Data ([908] 842-5757), XCd, Litco Systems ([416] 470-6366), MiLAN ([408] 752-2770), Compatible Systems Corp. ([303] 555-9532), Axis Communications ([508] 777-7957), and Dataproducts ([818] 887-8000).

Q Our company has connected the main file server and its RAID disk system to an uninterruptible power supply (UPS). We don't keep other devices, such as the tape backup unit or CD-ROM server, on the UPS so it will last longer when the lights go out. But during a recent power outage, the server experienced bard disk errors. One user said the problem might have arisen because we didn't put all our equipment on the UPS. Is he correct?

Debra Knight

A He's correct. Macintosh users have long known that you risk problems if you turn off any device on a SCSI bus while the others are running. It happens for two reasons. First, although SCSI devices are not supposed to interfere with the bus' operation when they are turned off, many do. Second, each device on the bus is a source of power for the bus' terminators. Shutting off any device while others are working can cause a voltage change on the bus, leading to errors.

If you want to make sure your UPS is effective, you have two options. The best is to power all of the SCSI devices through the UPS. Alternatively, you can try attaching the devices that are not protected by the UPS to a separate SCSI host adapter. In the latter case, one of the buses may cease to work, but the other will stay up and running.

Q I'm looking for an IBM 5250 emulator that will run under Windows. IBM's PC Support/36 forces me to return to DOS and reboot with a different AUTOEXEC.BAT and CONFIG.SYS. How can I transfer files to and from a System/36 without leaving Windows?

Vittorio Nicosia

A A quick search reveals several 5250 emulators designed specifically to run under Windows. They include RLink for Windows from Renex ([703) 494-2200); DynaComm/OpenConnect 5250 from FutureSoft Engineering ([713) 496-9400); IDEAcomm 5251 for Windows from IDEAssociates Inc. ([508] 663-6878); Elite/400 from Network Software Associates ([714] 768-4013); TwinView for Windows from Andrew Corp. ([310] 320-7126); OpenConnect/TN5250 from OpenConnect Systems ([214] 484-5200); WinTwin from Synapse Communications ([314] 443-8000); MultiVision from TeamWrite ([714] 744-1496); and 5250 Local for Windows from Micro-Integration Corp. ([301] 777-3307).

Micro-Integration also makes an add-on for IBM's software that lets you perform file transfers without leaving Windows.

Brett Glass' Help Desk answers readers' business computing questions. Brett cannot answer questions personally. Readers can leave questions by calling (800) 227-8365, Ext. 702 or by messaging CompuServe (72267,3673) or on the Internet at brett_glass@infoworld.com.

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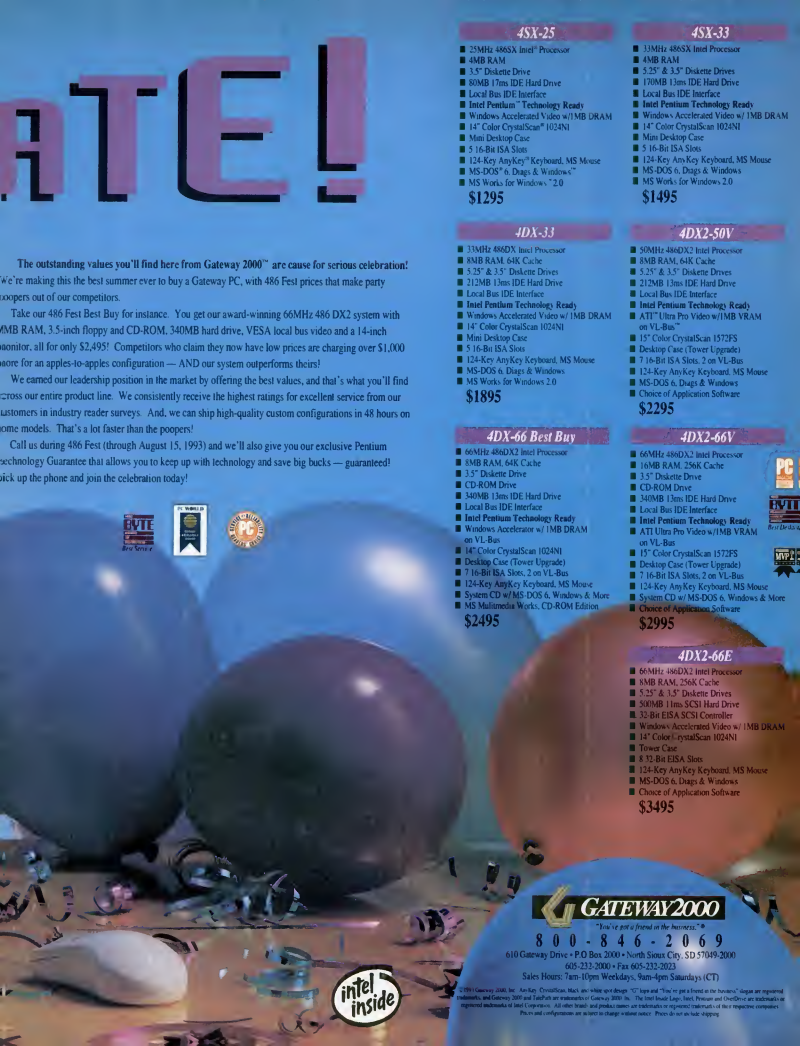

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Civilized Computing / Cheryl Currid

Cobol has its passionate defenders, but they are a minority

I expected to read the headline, "Cobol coders call for Currid's head."

My March 8 column (page 61) about dealing with the world's oversupply of Cobol programmers elicited a string of comments, emotions, and near E-mail melt down of my CompuServe mailbox. In fact, I'm still digging through the messages, trying to offer a personal reply to everyone who wrote.

In case you missed the column, let me give you the short version: Cobol is a dead language. Companies and schools should immediately move to newer environments that have shorter development cycles. Programmers who can be retrained should be, and those who can't should be assigned maintenance positions keeping the old code crunching. Companies should start Cobol conversions now, retrain existing staff, and fire anyone who won't go with the program.

Comments from critics and supporters alike were rich with emotion. The "Cease Cobol Plan" was either loved (by 80 percent of the readers who wrote me personally) or hated (by about 15 percent). Another 5 percent wrote in with questions about how to crawl out of the Cobol concentration camp. Let me share a few of my correspondents' thoughts.

First, the critics: These comments suggested that I was grossly uninformed, had my eyes closed to billions of lines of code, or was trying to be too much of a change agent in corporate IS shops.

One reader even cautioned the he "hoped the ghost of Admiral Hopper had a sense of humor," speaking of the late Grace Hopper, who actively supported standards for the Cobol language in its early days.

Another reader suggested that I learn Cobol to better understand its finer points. (Actually, I do know the language well enough to know there is a better life available with other programming environments.)

For those angry about my beliefs, I suggest you recheck the world outside Cobol canyon. Someday you might have to work out here.

Still another reader brought up an example where Cobol turned out to be a faster development environment than C++.

He did not provide enough details for me to be convinced that the horse race was among equals when it came to the programming staff. Nor did he mention whether the application could have been written with a more advanced tool, such as Visual Basic, PowerBuilder, or SQL Windows.

OK, now for those who agree with me: About 80 percent of my E-mail messages were from fellow anti-Cobol activists who cheered the notion of getting rid of the language in our lifetime. Many of these correspondents offered their own insights on how quickly Cobol is likely to fade from the front lines of corporate development.

In fact, several wrote about the effects of the transition to the post-Cobol era. They lamented the unfortunate process of handing out pink slips to people who had been faithful company employees but were no longer needed. Nobody (employer or employee) enjoys a lay off.

A few readers said the educational system was perpetuating the problems.

"The mass of professors are still teaching the old stuff. . . . They are tenured and set in their ways," one correspondent said. "They don't understand the event-driven environment and don't have plans to change their [own] skills."

Another reader placed the responsibility for updating skills squarely on the individual IS professional. "These aren't unskilled workers being replaced by cheaper labor from Mexico or Taiwan. These are supposed to be college-educated professionals," he said.

He supported the idea of personal responsibility for one's own professional education, saying, "Doctors don't need to be retrained because a new or better treatment is found. Neither should programmers. It's the responsibility of a professional to stay current and to forward the profession."

Finally, about 5 percent of my mail was from readers who wanted to know how to personally transition out of their Cobol concentration camps.

One in particular, a 28-year-old, was especially concerned because his employer wasn't helping or giving him opportunities outside solving immediate day-to-day support needs.

How do you negotiate the transition? To answer this question, I will survey some of my associates and clients who have successfully made the move. Sure, I have some ideas of my own, but I would like to supplement them with experience from other real life converts.

For those who took the time to write me, please accept my thanks as well as apologies for being slow to respond personally.

For those who are angry about my beliefs, I suggest that you recheck the world outside the Cobol canyon. Someday you might have to work out here.

Cheryl Currid, president of Houston-based Currid & Co., focuses on helping clients assess, apply, and organize for new information technology. Her CompuServe address is: 75300,2660.

The Network Curmudgeon / David Strom

Suggestions to ease the inevitable NetWare 4.0 migration

Running Novell Inc.'s NetWare 4.0 is inevitable, so you might as well start thinking now about how you are going to make the move.

First off, you will have to understand how your corporation is structured and whether or not you want to have your directory mirror this structure or mirror some ideal concept of what you would like to have.

The whole notion of an enterprise-level directory is probably foreign to you NetWare folks. I am reminded of that line from Firesign Theater: "Everything you know is wrong." No more attaching to different servers. You log-in once to the network, you get whatever resources (files, printers) you are entitled to, and you go about your business.

Indeed, if you really want to hire some help that understands the concept of enterprise directories, find yourself a Banyan administrator. They have been doing this stuff for years and probably will take to Novell's Directory Services naturally.

Second, think about how your existing NetWare clients are set up. (There's no rush if you have Macintosh clients; Mac support for 4.0 is not out yet.) If you are using the old-style "straight" Internetwork Packet Exchange (IPX) drivers (just load IPX and NET3), then you will have to do the most work to change your clients, and you might want to just go ahead and upgrade now and be done with it. Here's the issue:

NetWare 4.0 uses the Open Data-Link Interface (ODI) style of client drivers. (You will need new files; they come either on the DOSUP7 set on NetWire or with the 4.0 package.) This allows you to load more than one protocol (typically IPX and IP) talking to the same network adapter. It also uses a new style of network requestor called a Virtual Loadable Module (VLM). And finally, you will have to change your CONFIG.SYS file to put in a LASTDRIVE=Z command.

What this means is that you will have to touch every client on your network to get it to talk to a 4.0 server to exploit directory services. (Your existing clients can attach to a 4.0 server and appear just like a 3.11 server without the directory stuff.)

So what do you do? I'd buy a 10-user server-license CD and move some of your clients over to the new drivers. (They will still be able to log-in to your 3.x and 2.x servers just as before with the new clients.) You will also need to update your Windows drivers as part of this process, although all the files are part of the package.

I like having the CD for several reasons: It is handy to have all the files in one place, the on-line documentation set is really easy to use, and searching for things is a snap. And finally, it is less expensive than the printed manuals, and you will save a bunch of trees by not getting all that paper.

NetWare 4.0 uses the Open Data-Link Interface. This means you will have to touch every client on your network to get it to talk to a 4.0 server to exploit directory services.

Speaking of the CD, if you want to install a test server that has a SCSI disk drive, you might be better off getting two SCSI host adapters: one for the CD, one for the disk. This is what Novell recommends — apparently installing from the CD to a hard disk on the same SCSI adapter causes some problems. But once installed, running the CD and the disk from the same adapter is OK.

So now you have your test server set up (which should be at least a 486DX with 16MB of RAM), and you have moved some of your clients over to the latest VLM-style drivers. What next?

Time to try out those NetWare Loadable Modules (NLMs). Novell says most of them will work on a 4.0 server, but you never know until you try. Load them all and run your server for a few days with a few test users generating traffic. That's about the only way I know to really test them.

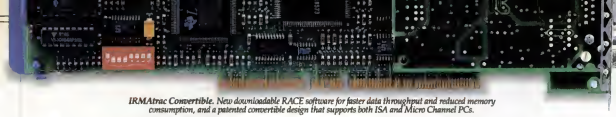
What about running NLMs in the protected mode? You can do it, but for now I would stick with just getting them to work in unprotected territory.

There are some other twists to navigate. Novell and IBM have set up some utilities to help you migrate from LAN Server 1.0 and from PC LAN Program, but I haven't met anyone who has used these yet.

You can see that there is a lot to learn about 4.0. The April 1993 edition of *NetWare Application Notes* has a really good explanation of the new stuff in NetWare 4.0 and how to migrate from older NetWare software. A one-year subscription to the newsletter is $95 ([800] 377-4136).

It will take time to understand what Novell has done here, let alone what the company is planning on doing. If you have some tips and tidbits you want to share with your fellow readers, you know where to reach me.

David Strom is president of his own consulting firm, In Port Washington, N.Y. He can be reached via MCI Mail at dstrom/3193660 or via the Internet at strom@radiomail.net.



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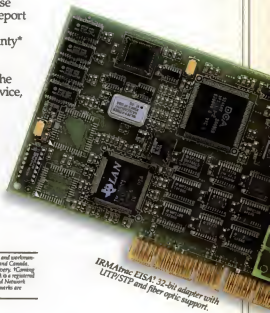

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Discovering a world beyond NetWare

InfoWorld tests eight TCP/IP NFS products for remote network services

WRITTEN, TESTED, AND DEVELOPED BY
NICHOLAS PETRELEY, NANCY DURLESTER,
AND **LAURA WONNACOTT**

EDITED BY **NICHOLAS PETRELEY**

With the arrival of high-powered CPUs such as the fast 486 chips and the Pentium, the PC puts more power on the desktop than ever before. Nevertheless, non-PC platforms such as the heftier Unix machines are often better suited to running the back end of client/server database applications than PCs running OS/2 or NetWare. Platforms such as the Unix machines offered by IBM, Sun Microsystems Inc., or Hewlett-Packard Co. usually use TCP/IP as their network transport protocol. Out of this arises the need to run TCP/IP on PC workstations that were previously limited to NetWare access.

Of course, client/server applications are not the only reason one would want to connect a PC to such a machine. Once TCP/IP users get access to a Unix host, they can take advantage of other remote resources, such as additional printers, file services, and the Internet.

We tested eight products — seven for the PC and one for the Macintosh — to see how well they could provide print and file services via a connection to a Sun Sparcstation 10 running Unix. We tested Beame & Whiteside Software Ltd.'s BW-NFS 3.0; NetManage Inc.'s ChameleonNFS 3.10 with IPX/Link; Novell Inc.'s LAN WorkPlace 4.1 with NFS Client for LAN WorkPlace 2.3; Wollongong Group Inc.'s PathWay Access for DOS 2.1.1 with Client NFS for PathWay Access 1.2.1 and PathWay Access for the Macintosh 2.1.1 with Client NFS for PathWay Access 1.2; SunSelect's PC-NFS 5.0; FTP Software Inc.'s PC/TCP 2.2; and Frontier Technologies Corp.'s Super-TCP 3.0.

Although it's obvious that none of these products has fully matured, we were pleasantly surprised with some of the results. We were particularly impressed with how easy some products made it to connect and print to our SunPics PostScript printer.

Many of the products are not limited to the features we tested. Many include some form of Simple Mail Transfer Protocol (SMTP) E-mail, and some include drivers and utilities to make the PC the host to other workstations. Others provide a station-to-station chat mode. We restricted our tests, however, to a few of the most common features: terminal access and file and print services. (E-mail is also an important function, but we will test it in a separate comparison.)

With the exception of PathWay Access for the Mac, the biggest thorn in the side of these products is the installation process. The experience is nothing if not educational. You may not know much about network protocols when you begin an installation, but we guarantee you will know a lot more by the time you are finished.

We acknowledge that PC configuration is so convoluted that it is difficult to create an installation program that can survey a PC's configuration files well enough to know exactly what to add, delete, and change. But what surprised us was that many of the products did not even make the attempt. They make a few changes to your CONFIG.SYS and AUTOEXEC.BAT and then expect you to complete the job with a text editor and a handful of third-party drivers (which also have to be configured manually). Of the PC products, only Beame & Whiteside's BW-NFS and NetManage's ChameleonNFS provided all the drivers we needed to get TCP/IP up and running alongside NetWare IPX.

If the target machine is a PC, then keep memory management in mind when you consider these products. The TCP/IP and NFS drivers and Open Data-Link Interface (ODI) or Network Driver Interface Specification (NDIS) drivers needed for NetWare IPX to coexist with TCP/IP eat a significant amount of RAM. Add to that SmartDrive, a mouse driver, DOS Share, and maybe even DOSkey, and there isn't much RAM left to go around. Some of the drivers can be loaded high, but watch out — some can't, even when the vendor says they can. Two of the products, ChameleonNFS and Super-TCP, save some memory because they can be installed as Windows-only programs that use Dynamic Link Libraries instead of terminate-and-stay-resident drivers.

TCP/IP NFS products open a new world to PCs and Macs

We approached testing with the assumption that TCP/IP capability was being added to an existing NetWare environment, so we installed the products to coexist with NetWare Internetwork Packet Exchange (IPX). Once connected to both a NetWare server and the Sun Sparc, we wanted to see how easy it was to access the printers on the Sparc and what it was like to work with the foreign Unix file system. We also tested the basic functions of the Telnet terminal emulation features using both VT-100 and VT-220 mode. These programs are useful for command-line access to a foreign host.

To test Wollongong's PathWay Access for the Macintosh, we used a Macintosh Quadra 950 with 8MB of RAM running System 7.0.1.

We installed each PC product on a Tangent 33-MHz 486 equipped with a 120MB integrated drive electronics (IDE) hard drive and 4MB of RAM. We used DOS 5.0 and the Windows version 3.1 SMARTDRV.EXE.

We logged in to a NetWare server and connected to the Unix server simultaneously before beginning the tests.

For the PC products, we tested the Windows programs only, although we installed the DOS programs when available. Super-TCP gives you the choice of installing the drivers as TSRs or as Windows Dynamic Link Libraries (DLLs). You cannot use the DOS programs if the product is installed with DLL TCP/IP drivers.

The target Unix machine was a Sun Sparcstation 10 equipped with 32MB of RAM. The Tangent PC, Macintosh, and Sparcstation were connected on a single network segment with no other active workstations residing on that segment.

PERFORMANCE:

File transfer: All the products provided both a command-line File Transfer Protocol (FTP) version and a graphical user interface (GUI) version. We used the GUI file transfer program to test the speed of transferring files back and forth from PC or Mac to the Sun Sparc 10. We used the Windows-based FTP programs to test file transfer when both a DOS and a Windows version were supplied. We transferred two large files: a 1½MB executable file and a 3MB ASCII file. We timed the transfer of both files to and from the Sun Sparc.

FTP programs can transfer files in at least two modes: text and binary. We transferred the executable file in binary mode and the ASCII file in text mode. FTP text mode converts text files to arrive on the target machine in the correct format. In Unix format, each character string in a text file is terminated with a single line-feed character. In DOS, character strings are terminated with a carriage return/line-feed pair. On the Macintosh, strings are terminated with a single carriage return. FTP programs convert files to Unix format and back to the DOS or Mac format automatically during text mode transfers. We verified each text file to see if it arrived at its destination in the proper format. No product corrupted the file during transfer.

We averaged the speed of the text and binary transfers into a single benchmark result. The average had to be 46 to 60 seconds to earn a satisfactory score, 31 to 45 seconds earned a score of good, and 16 to 30 seconds a very good score. File transfers averaging 15 seconds or less earned an excellent score, and transfers between 61 seconds and 2 minutes were considered poor. Transfers averaging greater than 2 minutes were unacceptable.

Terminal emulation: We tested the Telnet programs in two of the most popular terminal modes: VT-100 and VT-220. We performed two different tests in each emulation mode: scrolling and cursor movement. We typed (using the Unix command cat, which means concatenate and display) a text file to the screen to test scrolling. We used our own terminal cursor manipulation benchmark to test cursor placement. The benchmark moves the cursor to different locations onscreen and prints or erases text at each location. Text is displayed in various modes (bold, blinking, underline, etc.). This portion of the benchmark reflects the response time you may get when using complex data entry screens or menu-driven interfaces in VT-100 or VT-220 mode.

We averaged the scores for scrolling and cursor movement into a single terminal emulation benchmark. The average time had to be 76 to 90 seconds to earn a score of satisfactory, 61 to 75 seconds to earn a good score, and 46 to 60 seconds to earn a score of very good. Times of 45 seconds or less were considered excellent. Times between 91 and 105 seconds were considered poor, and times greater than 105 seconds were unacceptable.

DOCUMENTATION:

Documentation scores reflect the quantity and quality of the written manuals and the on-line help. Documentation must have a table of contents and index, and it should give a step-by-step description of the installation procedure to get a score of satisfactory. Better scores were given for documentation that provides clearly written details about additional network card and protocol drivers. We added bonuses for good quick-reference guides or additional useful materials. Poor organization, missing information, or an incomplete index lowered the score.

EASE OF INSTALLATION:

We awarded a satisfactory score to products with documentation that provided a clear step-by-step explanation of how to get TCP/IP running and coexisting with NetWare. We gave bonuses to products that gave on-line access to this information from the installation program.

None of the products truly led us step-by-step (via prompts and data entry, for example) through a complete installation, nor did any of the PC products perform all the necessary configuration details.

We subtracted from the score when a product's installation program malfunctioned or indicated it was going to perform a configuration step but failed to do

See HOW WE TEST, page 112

Executive summary

The products we tested are capable of a lot more than the features we evaluated. Many have DOS utilities that mimic Unix commands. Most support E-mail. And several protocols are supported besides the two we used — Open Data-Link Interface (ODI) and Network Driver Interface Specification (NDIS). We evaluated these products primarily on the basis of how well they integrated with NetWare and the target operating system (Microsoft Windows or Macintosh System 7) and how well they performed file transfers and VT-100 or VT-220 terminal emulation.

No single product outshone all the others in every area. Of the top four, SunSelect's PC-NFS had the best documentation. FTP Software's PC/TCP transferred files quicker than all the others. Frontier Technologies' Super-TCP integrated best with Windows, and NetManage's ChameleonNFS was the easiest to install. But overall, there is no clear winner; few did poorly, and none were exceptional in any area except, perhaps, speed.

PC-NFS is a well-rounded product and one of the fastest we tested. The documentation is extensive and thorough. The browse functions for picking a host and directory in the Windows File Manager are terrific. It's not easy to install the first time, but successive installations are painless unless you have to juggle drivers in high RAM. PC-NFS is the memory hog of the bunch. A minor glitch seems to be around every corner, but it is never serious.

PC/TCP comes across as a set of programs written and maintained by people who eat, drink, and breathe network protocols. The package is even more comprehensive than PC-NFS, and the programs are fast, particularly at transferring files. Unfortunately, the documentation and installation program is composed as if the folks at FTP Software expect everyone to know as much about networking as they do. It doesn't help that the installation program misbehaves.

Super-TCP is an uneven product, but it leans in the right direction if you spend all your time in Windows. Super-TCP handles the Windows File Manager the best of all the products. Its capability to switch back and forth between long Unix names and mapped DOS names in File Manager is a real delight. The fact that it can be installed for either Windows-only operation or DOS and Windows gives it an edge over ChameleonNFS, but the edge is a narrow one. If you install Super-TCP for both DOS and Windows, the Windows performance goes down the tubes. The documentation also leaves much to be desired.

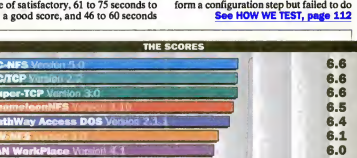
ChameleonNFS is the easiest to install of the PC products, partly because it has only one option for NetWare coexistence. The product we reviewed is based on Dynamic Link Libraries (DLLs), so it only works with Windows. It saves you memory, but unlike Super-TCP, it does not buy you speed — it was the slowest at terminal emulation. NetManage does sell a DOS product, but you must pick between DOS and Windows operation for every machine. In addition, the DOS version is not compatible with the Windows version.

Wollongong Group's **PathWay Access for DOS** is deceptively simple — there is more to the few programs Wollongong includes than meets the eye. We like the capability to save the setup of a terminal session to a separate Windows icon. The capability to associate file extensions with ASCII or binary transfers is also a plus, but the program is a little short on utilities and ease of use.

Beame & Whiteside's **BW-NFS** did not have the easiest installation, but it gets a round of applause for supplying every driver we needed for a complete installation. It even included the Novell LSL and IPXODI drivers for NetWare coexistence. On the plus side, the File Transfer Protocol program supports drag-and-drop copying of files. On the minus side, we got general protection fault errors in the terminal program and found it more difficult than necessary to specify a remote host or printer.

Novell Inc.'s **LAN WorkPlace** had the best FTP program. Its iconic drag-and-drop copying of files is a refreshing alternative to the side-by-side list boxes in most of the competition. LAN WorkPlace is hurt mostly by careless errors and oversights in the design. The installation program fails to give you enough information. But worst of all is the glitch that causes LAN WorkPlace to require a short printer name in all lowercase.

Wollongong Group's **PathWay Access for the Macintosh** can boast about two things: its incomparably easy installation and its terminal emulation speed. But don't look too much deeper than that; there's nothing there. Printing is unreasonably difficult (it didn't even work with our SunPics printer), and there is a dearth of TCP/IP utilities.



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Home Office Computing 1/93

Software Digest — **RATINGS REPORT**

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Vol.9, #6, September 1992

Advanced Word Processors for Windows	
	Overall Evaluation
1ST Ami Pro 3.0 for Windows	**8.7**
2ND Word for Windows 2.0	8.1
3RD WordPerfect 5.1 for Windows	6.1

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HOW WE TEST / from page 109

TCP/IP NFS products

so. We also lowered the score when information critical to getting the product running properly was omitted.

DAILY OPERATION:
We conducted a series of tests that represent common operations, such as copying files and operating a Unix machine at the command prompt via a terminal program.

We gave a satisfactory score to products that offered a version of FTP that let us copy and delete files and change directories and drives by just pointing and clicking. We subtracted points from products that required more work for these simple operations.

We placed the Windows Notepad program and a DOS shell in a directory on the Sparc and ran them from the Windows File Manager. ChameleonNFS could not run DOS programs, even from a DOS window in Windows.

For the Network File Services, we expected it to be no more difficult to attach a remote printer on our Sun Sparc than it would be to access a remote printer on a NetWare server. Likewise, we expected it to be as easy to access directories on the Sparc as it would be to map drives on a NetWare server. We gave bonuses to those products that made these tasks easier.

Unix file names are very different from DOS file names — case is significant and they can be much longer (longer even than Macintosh file names). DOS products compensate for the difference by remapping the Unix file names to an 8.3 format (eight file name characters, three characters for the extension). The Macintosh product truncates file names to 32 characters. Some of the DOS products insert one or more special characters (such as a tilde). PC-NFS adds random letters in the mapping process. The FTP file transfer utilities all show you the full Unix names.

We gave bonuses to products that eased the transition between the two file name formats. All of the DOS products but PC/TCP and Super-TCP remap the names so that they appear in 8.3 format in the Windows File Manager. PC/TCP and Super-TCP let you switch back and forth between full Unix names and remapped file names (though it is more difficult in PC/TCP). We also gave bonuses to products that assisted us with the file name conversion when we copied files.

Telnet terminal emulators identify themselves by sending a terminal ID when they connect to the host. This ID tells the host what type of terminal is attached so the host will know what control codes to use. However, different types of hosts expect different identifiers, even for the same terminal type. For example, one host may expect the ID to be "DEC-VT100" while another understands only "VT100." We added bonus points if the terminal emulator made it easy to change the identifiers the host will receive.

SUPPORT:
Support policies: Support policies are graded on a point scale. Products received 2 points if there is unlimited free support. If the support is not unlimited but 90 days or more, it received 1½ points. Products received 1 point for free support with limited connect time, or for free dealer support. A point is added if the support phone number is toll-free. A money-back guarantee or evaluation period added 1 point. Products get a half point for having fax support, a half point for a private BBS, a half point for CompuServe, and a half point for extended hours (beyond business hours and/or weekends). We considered a total of 5.0 and above as excellent, 4.0 to 4.99 very good, 3.0 to 3.99 good, 2.0 to 2.99 satisfactory, 1.0 to 1.99 poor, and below 1.0 unsatisfactory.

Technical support: We based scores for technical support on the availability of technicians and the quality of service we received during the course of multiple anonymous calls to the vendor.

VALUE:
Our value score balances features, compatibility, and performance against price compared with competing products in the category.

REPORT CARD

INFO WORLD

TCP/IP NFS

		BW-NFS Version 3.0	ChameleonNFS Version 3.10	LAN WorkPlace Version 4.1	PathWay Access for DOS Version 2.1.1	PathWay Access for the Macintosh Version 2.1.1	PC-NFS Version 5.0	PC/TCP Version 2.2	Super-TCP Version 3.0
		$349.00	$645.00[1]	$894.00[2]	$615.00[3]	$590.00[4]	$415.00	$400.00	$495.00
Performance									
File transfer	(125)	G	VG	VG	VG	P	VG	E	VG
Terminal emulation	(75)	VG	S	E	E	E	E	VG	G
Documentation	(50)	P	S	G	G	G	VG	S	P
Ease of installation	(200)	G	VG	S	G	E	S	P	G
Daily operations	(200)	S	G	S	S	P	S	G	VG
Support policies	(75)	VG	VG	S	S	S	VG	E	G
Technical support	(75)	S	S	S	VG	VG	VG	VG	S
Value	(200)	VG	G	G	G	P	VG	VG	VG
Final scores	(1000)	**6.1**	**6.5**	**6.0**	**6.4**	**5.3**	**6.6**	**6.6**	**6.6**

[1] Price includes both ChameleonNFS ($495) and companion product IPX/Link ($150)
[2] Price includes both LAN WorkPlace for DOS ($399) and NFS Client for LAN WorkPlace for DOS ($295)
[3] Price includes both PathWay Access for DOS ($350) and Client NFS for PathWay Access for DOS ($265)
[4] Price includes both PathWay Access for the Macintosh ($295) and Client NFS for PathWay Access for the Macintosh ($295)

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parenthesis) of each criterion by its rating, where:

Excellent = 1.0 – Outstanding in all areas.
Satisfactory = 0.5 – Meets essential criteria.
Very Good = 0.75 – Meets all essential criteria and offers significant advantages.
Poor = 0.25 – Falls short in essential areas.
Good = 0.625 – Meets essential criteria and includes some special features.
Unacceptable or N/A = 0.0 – Fails to meet minimum standards or lacks this feature.

We now present a numerical (rather than a word) score for quantitative tests such as speed and accuracy. We award full points for each category to the best performer. The other products receive a percentage of the total points based on their respective performances.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to *InfoWorld* readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

Products receive *InfoWorld* Buyers Assurance Seals if they meet the following conditions: Software vendors must offer 60-day money-back guarantees on the products, and hardware vendors must offer a one-year repair or replacement warranty. No product is eligible that receives a score lower than Satisfactory in any of our Report Card categories. Vendors who qualify have signed contracts with *InfoWorld* that detail these support policies. (*InfoWorld* does not charge for the Buyers Assurance Seal.) We award the Recommended Seal to products that, in addition to the above criteria, receive a final score of 8.0 or higher.

BENCHMARKS

INFO WORLD

TCP/IP NFS

	BW-NFS Version 3.0	ChameleonNFS Version 3.10	LAN WorkPlace Version 4.1	PathWay Access for DOS Version 2.1.1	PathWay Access for the Macintosh Version 2.1.1	PC-NFS Version 5.0	PC/TCP Version 2.2	Super-TCP Version 3.0
File transfer								
PC-Unix ASCII	01:17	00:24	00:31	00:18	01:01	00:29	00:10	00:29
Unix-PC ASCII	00:17	00:42	00:26	00:27	01:51	00:34	00:18	00:33
PC-Unix Binary	00:40	00:09	00:12	00:10	01:17	00:15	00:05	00:16
Unix-PC Binary	00:08	00:17	00:09	00:14	00:57	00:18	00:07	00:17
Avg file transfer	00:36	00:23	00:20	00:17	01:16	00:24	00:10	00:23
Terminal emulation								
VT-100 Scrolling	00:31	01:17	00:30	00:53	00:31	00:44	01:06	01:15
VT-100 Cursor movement	01:08	02:10	00:52	00:35	00:44	00:33	00:41	00:57
VT-220 Scrolling	00:31	00:55	00:10	00:53	00:32	00:45	01:06	01:13
VT-220 Cursor movement	01:44	01:38	00:39	00:26	00:38	00:32	00:39	00:57
Avg terminal emulation	00:59	01:30	00:33	00:41	00:36	00:38	00:53	01:04

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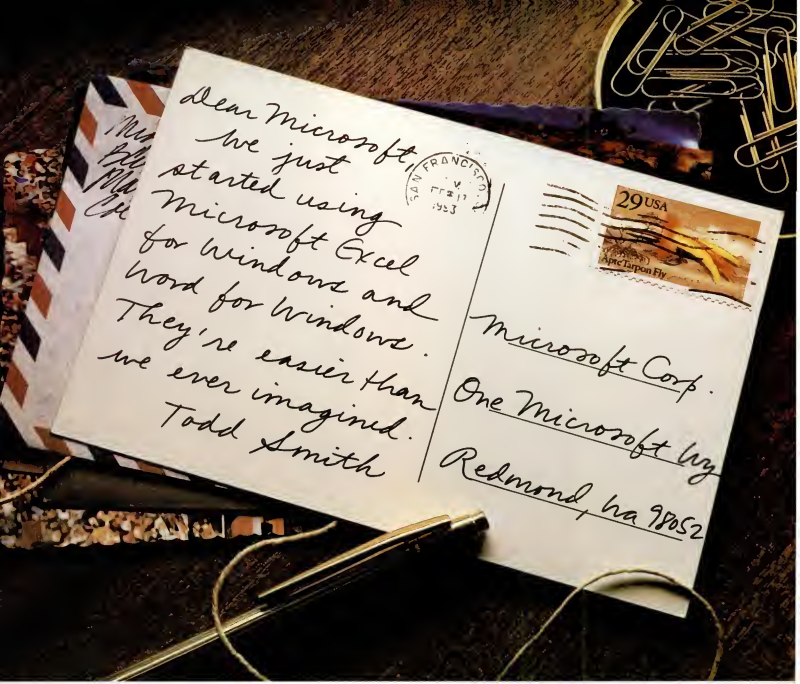

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BW-NFS
Version 3.0

BW-NFS, from Beame & Whiteside Software Ltd., includes both a DOS and Windows implementation of many of the TCP/IP utilities. Like all the PC products except ChameleonNFS, BW-NFS provides TCP/IP support in DOS and Windows simultaneously. You will be able to mount and access drives and printers from either environment.

BW-NFS is the only product besides ChameleonNFS that gives you all the drivers you need to get running with NetWare. And it's the only one to give you all the drivers for Open Data-Link Interface (ODI) operation (ChameleonNFS uses Network Driver Interface Specification drivers). It has one of the easiest File Transfer Protocol (FTP) programs. It's the only product besides LAN WorkPlace to have a drag-and-drop operation in FTP.

BW-NFS has a Telnet program with support for VT-220, VT-100, VT-52, and TN-3270 terminal emulation. BW-NFS has a nice utility called BW-Show that can help you troubleshoot your installation. You can have BW-Show write debug information to a log file, which you can print and fax to their technical support.

The total disk space of all the drivers needed to run BW-NFS with NetWare, including the NetWare drivers, came to approximately 134KB. All the BW-NFS drivers are loadable into high memory.

ChameleonNFS
Version 3.10

We tested both NetManage Inc.'s ChameleonNFS and its add-on product IPX/Link, which provides IPX compatibility. ChameleonNFS is the only TCP/IP product in this comparison that is exclusively for Windows. NetManage has a separate DOS product, but it is not bundled together with the Windows product, nor can it be installed along with the Windows product on the same machine. You will have to commit to either DOS or Windows (or use a multiple boot configuration utility) if you want to use NetManage's product line. NetManage supports only NDIS for NetWare coexistance.

The Windows product, which we tested, does not include remote execution utilities. NetManage's DOS product does include them. Otherwise, ChameleonNFS for Windows has the standard complement of utilities, such as PING, and utilities to convert ASCII files from DOS to Unix format and vice versa. ChameleonNFS also provides Simple Mail Transfer Protocol mail user agent and a Simple Network Management Protocol agent. The Telnet program emulates ANSI, VT-52, VT-100, VT-220, and TTY. ChameleonNFS provides a separate icon for TN-3270 terminal emulation.

ChameleonNFS uses very little memory because most of the work is done by Windows programs and Dynamic Link Libraries. With all the ChameleonNFS drivers loaded along with IPX and NETX, the total memory used was approximately 74KB. All of ChameleonNFS' drivers are capable of being loaded into high RAM.

LAN WorkPlace
Version 4.1

We looked at both Novell Inc.'s LAN WorkPlace for DOS and the NFS Client for LAN WorkPlace for DOS, two separate products that work together to provide TCP/IP and NFS services. Novell LAN WorkPlace for DOS includes both DOS and Windows programs. The program group in Windows is filled with utilities. Many of the icons that appear actually run DOS programs, but the programs we tested — Telnet and File Transfer Protocol (FTP) — are native Windows applications.

LAN WorkPlace includes the standard set of utilities, such as programs to convert ASCII files from DOS to Unix format and back again. It has Simple Network Management Protocol capability. There are a few utilities that emulate Unix commands such as ls. You can reconfigure the keyboard in the Telnet program, which emulates ANSI, TN-3270, VT-52, VT-100, and VT-220. WorkPlace earns the distinction of having one of the fastest Telnet programs of the products we tested.

LAN WorkPlace's FTP file transfer utility is one of the simplest to use. Outside of that, however, WorkPlace was often one of the most difficult programs in this comparison. It lacks browse features that would make it easy to choose available printers, hosts, and paths when you want to map drives or connect to printers. Even entering this information manually is fairly difficult.

LAN WorkPlace for DOS can load all drivers in high memory. There are eight drivers necessary to get both TCP/IP and Internetwork Packet Exchange (IPX) running concurrently. They used approximately 155KB of RAM.

PathWay Access
for DOS, Version 2.1.1

We used The Wollongong Group Inc.'s PathWay Access for DOS and Windows, Version 2.1.1, along with PathWay's Client NFS, Version 1.2.1. These require PathWay Runtime 1.2, which is included. The Windows portion of PathWay Access is somewhat limited in terms of TCP/IP utilities. PathWay Access was the only product we tested in which the PING utility was not available for Windows (there is a PING for DOS that works in a DOS window). PathWay Access for Windows has three modules — File Transfer Protocol (FTP), Telnet, and Printer Session — all of which are accessed through a single Windows program.

PathWay Access has a flexible terminal emulation program. You can easily edit the terminal name and save the session to a file or an icon. The terminal session under Windows is similar to the Macintosh version of the product. Useful information, such as row and column coordinates, appear at the bottom of the terminal screen.

The FTP program has some useful extras. You can teach it to associate file extensions with the proper transfer type (ASCII or binary). It tries to suggest a friendly DOS-compatible name when copying extended Unix file names from the Sun to the PC. It was also very quick at transferring files.

When you load PathWay Access for DOS along with NetWare's Open Data-Link Interface (ODI) drivers, the drivers use 135KB of RAM. You can load some drivers into high RAM.

PERFORMANCE: FILE TRANSFER

BW-NFS was the fastest in transferring both our binary and ASCII files from the Sun to the PC, although it took an update from technical support to get that speed. In sharp contrast, it had the slowest time in transferring our ASCII file from the PC to the Sun. **Score: Good.**

The File Transfer Protocol (FTP) file transfer speed averaged an impressive 23 seconds. ChameleonNFS was a little slower copying files from the Sun to the PC than the reverse. **Score: Very Good.**

LAN WorkPlace was one of the fastest products at transferring files. It took an average of 20 seconds in our FTP file transfer tests. The speed was about the same in both directions, PC to Sun and Sun to PC. **Score: Very Good.**

PathWay Access was second only to FTP's PC/TCP in average file transfer time. Like most of the others, it was faster going from the PC to the Sun than the reverse. **Score: Very Good.**

PERFORMANCE: TERMINAL EMULATION

BW-NFS performed the scrolling portion of our terminal test second to Novell. They did not do as well running our cursor placement benchmark, especially in VT-220 mode. BW-NFS turned in the slowest time in our cursor movement test in VT-220 mode. **Score: Very Good.**

The ChameleonNFS Telnet speed averaged 1 minute and 30 seconds between VT-100 and VT-220 emulation, which was the worst overall Telnet score, although it still performed in an acceptable range. It did better at VT-220 emulation than VT-100 and performed better at scrolling than at cursor positioning. **Score: Satisfactory.**

LAN WorkPlace blazed in our scrolling tests, especially when we used VT-220 mode. It was one of the fastest in VT-100 mode as well. **Score: Excellent.**

PathWay Access's terminal emulation was one of the quickest at both scrolling and cursor movement. It was in the top three, along with PathWay Access for the Mac and Novell Inc.'s LAN WorkPlace. **Score: Excellent.**

DOCUMENTATION

There is a single manual that contains separate sections for each portion of the program. There is no index for the entire manual, nor are there indexes for important sections of the manual. We found it difficult to locate information, partly due to the lack of indexes and because the manual is poorly organized. The installation section contains misleading information that led us astray. **Score: Poor.**

The installation chapter in the documentation was fairly clear and concise, but the remainder of the documentation lacked detail. The documentation included a table of contents and index, which made it easy to look up information. The troubleshooting section at the end of most application chapters was helpful but lacked some information. The on-line help supplemented the documentation well and offset some of our disappointment with the written documentation. **Score: Satisfactory.**

LAN WorkPlace for DOS included a configuration guide, an administrators' guide, and a users' guide. Each guide included a glossary of terms and an index. The administrators' guide gave a description of each program, as well as options and parameters for usage. LAN WorkPlace includes on-line help for its Windows programs only. **Score: Good.**

There are three separate manuals for PathWay Runtime, PathWay Access, and Client NFS. The Runtime manual contains many examples of both AUTOEXEC.BAT files and NET.CFG configuration files for the driver interfaces supported. The PathWay Access manual integrates information on both DOS and Windows products and the Mac product, which may appear awkward to some. There are good screen shots, and information is easy to find. **Score: Good.**

See BW-NFS, page 116 See CHAMELEONNFS, page 116 See LAN WORKPLACE, page 116 See PATHWAY ACCESS DOS, page 116

PathWay Access
for the Macintosh, Version 2.1.1

We tested PathWay Access for Macintosh, Version 2.1.1 and Client NFS for PathWay Access 1.2. Wollongong's PathWay Access for Macintosh product was the star of the group in ease of installation. On the down side, it was the only product that would not print to our SunPics printer connected to the Sparc 10.

PathWay's File Transfer Protocol (FTP) program displays a number of Unix commands that, when clicked, execute remotely on the host. The output for that command appears directly under the FTP screen. For example, clicking on the DIR command lists a directory on the Sparc in standard DOS format. Clicking on the ls command lists a directory in Unix is format. You can also enter custom commands.

PathWay Access for the Macintosh is not as rich in features as some of the other PC products, because it depends heavily on the Apple TCP/IP stack and Apple's utilities. There is no PING, for example. Apple developed a PING utility for its TCP/IP stack, which will ship with Wollongong's next version of PathWay Access for Macintosh.

The program supports TN3270, VT-220, VT-100, and VT-320 terminal emulation. Although it is not a part of the basic package, you can purchase graphical terminal emulators, including VT-340, Tektronix, and TN3179G separately.

PathWay Access for Macintosh needs NFS, NFS Mounter, Mac-TCP, Network Extensions, and EtherTalk drivers. It was difficult to get a definitive number for memory usage, but it appears these drivers add up to about 410KB.

PC-NFS
Version 5.0

At Version 5.0, SunSelect's PC-NFS has been around a while, but it still needs a little more aging to become a vintage product. There are some very nice touches in some places; in others it doesn't go quite far enough. PC-NFS is one of the five PC products here that doesn't give you the option of displaying the mapped directories and files in their full Unix format. (Only PC/TCP and Super-TCP do that.)

PC-NFS includes the full complement of Unix utilities for DOS. PC-NFS can take advantage of a network information service (NIS) if one is running. NIS is a program that works with a central database of network information to make it easier to manage large networks. (We did not have NIS running on our Sparc.) A few commands are included that let you query the database for network information.

PC-NFS uses a whopping 199KB of RAM for all the drivers it needs for TCP/IP and NetWare IPX coexistence. The lack of memory seriously affected PC-NFS performance at first. We could not get the ASCII format from the Sun to the PC to work at all unless we added physical RAM to the machine. At the suggestion of technical support, we added the switch /segsize 1024 to the command line that loads the Windows resident transport module (RTM). This fixed the problem and restored PC-NFS to normal operation under 4MB of RAM. A few of the drivers can be loaded into the high-RAM to free up more conventional memory, but we had trouble loading in high memory all the drivers that the documentation says you can.

PC/TCP
Version 2.2

We tested FTP Software's PC/TCP for DOS/Windows, Version 2.2. PC/TCP is bundled with a complete set of both DOS and Windows commands. With specific TCP/IP utilities, both a Windows and DOS command are available. For example, PC/TCP offers both commands for PING, Telnet, and FTP.

The Windows programs include a terminal program, message transfer agent, PING, file transfer, network utilities, and access to remote file systems and printers. There are equivalent DOS programs, plus other DOS utilities for print management, mail, remote log-in, and remote program execution. Any of the DOS programs will run under Windows.

PC/TCP displays connection information for remote hosts and services. You can view and file permissions, time-outs for transactions, look-up cache, and pending file locks. There is a complete set of network utilities, including a program that shows information concerning the PC/TCP kernel, connections, network tables, and caches.

PC/TCP includes Interdrive, which is the NFS client portion of the program and works under Windows. Interdrive allows you to transfer files to and from the host, read and edit files on the host, run local DOS applications on the host, and share remote files.

All the drivers required a total of approximately 177KB of RAM. Given the seven PC products, the memory requirements are second only to SunSelect's PC-NFS, which uses about 22KB more. Some of the drivers can be loaded in high memory.

Super-TCP
Version 3.0

Super-TCP for Windows is a mixed bag. It has a refreshingly well-thought-out design in some areas and falls short of the mark in others. Super-TCP integrates with Windows' File Manager better than any of the other products we tested. It's the only product that lets you switch easily between viewing Unix files and directories in their full Unix format and seeing them as mapped DOS-sized names.

Super-TCP includes a host of native Windows utilities common to DOS TCP/IP products, including the remote execute, copy, and shell programs. It also has the DOS counterparts. It includes Simple Mail Transfer Protocol (SMTP) E-mail with Multipurpose Internet Mail Extensions (MIME), and a Telnet terminal that emulates TN3270, VT-320, and VT-100. It has Simple Network Management Protocol (SNMP) capability.

You can install Super-TCP as a Windows-only product. Unlike Chameleon-NFS, you can install Super-TCP like the other PC products, to work with both DOS and Windows on the same machine. This eats up more RAM, and the DOS TSR slows down its performance dramatically — our ASCII file that took 33 seconds to transfer on a Windows-only installation took 5 minutes to complete when we installed it for both DOS and Windows. Even when we installed it as a Windows-only product, it used a hefty 152KB of RAM for all the drivers, including the NetWare Open Data-Link Interface (ODI) drivers.

Frontier sells a Windows Sockets Developer's Toolkit for $595 for those who want to tap into the world of TCP/IP in their Windows programming.

PERFORMANCE: FILE TRANSFER

FTP speed averaged 1 minute and 16 seconds, which makes PathWay Access for the Mac one of the slowest products tested by far. It was much slower transferring an ASCII file from the Sun to the PC than the reverse. **Score: Poor.**

File transfers in PC-NFS averaged a very respectable 24 seconds. If you have 4MB of RAM, however, be sure to adjust the segment size used by the Windows RTM, or the File Transfer Protocol (FTP) will run slowly and often fail completely. **Score: Very Good.**

PC/TCP turned in the most impressive time in our file transfer test. PC/TCP performed best when moving files from the PC to the Sun. **Score: Excellent.**

Super-TCP was one of the few products that transferred files at about the same speed whether we were passing files to or from the Sparc. It was among the quickest of the group in this category at an average speed of 29 seconds (when run as a Windows-only product). **Score: Very Good.**

PERFORMANCE: TERMINAL EMULATION

The terminal emulation speed averaged 36 seconds, which was one of the best of all products tested. It did equally well in scrolling and cursor movement. **Score: Excellent.**

Running the RTM without the segment size adjusted, PC-NFS did very badly in this category, taking up to 2 minutes to finish some tests. Once we used the proper switch, however, it blazed at an average of 38 seconds. It did equally well in VT-100 and VT-220 mode. **Score: Excellent.**

PC/TCP did not perform as well in our terminal emulation test as it did in the file transfer test. Out of the eight products, it came in fourth. It performed the cursor movement portion of our test better than scrolling. **Score: Very Good.**

The terminal program showed consistent performance whether we were using it in VT-100 or VT-220 mode. This particular terminal doesn't actually run in VT-220 mode. It runs in the upward-compatible VT-320 mode and identifies itself as a VT-220 to the host. Super-TCP was better at cursor movement than at scrolling. **Score: Good.**

DOCUMENTATION

PathWay Access for Macintosh included documentation that was clear and concise. The installation guide included steps for both System 6 and System 7. The users' guide included documentation for both the Windows and Macintosh products. The guide also contains tables with problem-solving techniques and error messages. **Score: Good.**

PC-NFS comes with six manuals, including a users' manual, reference, installation guide, serial communications guide, administration guide, and master index. Many manuals include a glossary. There's also a quick install and quick-reference pamphlet. You will find the documentation ultimately is quite thorough if you read ahead and dig deep enough. It occasionally lacks a procedural approach to installation where needed. **Score: Very Good.**

PC/TCP's documentation includes six separate manuals: installation and configuration guide, installation summary, a users' guide, a Windows and command reference, command quick reference, and the current release notes. The installation guide lacks coverage on running the automatic installation. PC/TCP's documentation, if difficult to follow, is the most technically complex. There is no master index. **Score: Satisfactory.**

Super-TCP comes with a single manual that is very inconsistent in quality. At one point it will give you a thorough walkthrough of a procedure, and at another point it will leave out important information on a topic. In one place, the manual directs you to a Harvard University IP Internet address if you want to download more information. The table of contents is sparse and unorganized, and the index is thin as well. Error messages are well documented, however. **Score: Poor.**

See PATHWAY ACCESS MAC, page 117 See PC-NFS, page 117 See PC/TCP, page 117 See SUPER-TCP, page 117

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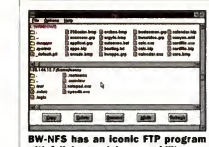
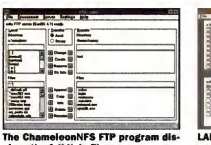
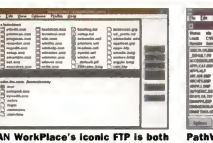


BW-NFS has an iconic FTP program with full drag and drop capability.



The ChameleonNFS FTP program displays the full Unix file names.



LAN WorkPlace's iconic FTP is both powerful and easy to use.

PathWay Access FTP has point and click access to drives and directories.

BW-NFS *Continued*

ChameleonNFS *Continued*

LAN WorkPlace *Continued*

PathWay Access for DOS

EASE OF INSTALLATION

The awkward BW-NFS installation program prompts you with the generic message, "Insert any unprocessed disk and press Enter." It is up to the user to figure out which disks to install next. As an added nuisance, the installation messages in pop-up windows were often truncated midword, as though the programmers had not checked to see if the entire message would fit.

The installation program enters Windows and adds three new program groups. Unfortunately, the entire Windows portion of the installation is manual. We had to run the Windows Setup program to install the BW-NFS Windows network driver.

BW-NFS earns special kudos for being the only product to include every driver we needed for a complete installation, even the Novell drivers that give BW-NFS the capability to coexist with NetWare. These ODI drivers and others that the competition left out are readily available elsewhere (some are installed with Windows, others are on NetWare disks and bulletin boards, for example), but we really appreciate the convenience offered by Beame's product. It makes up for some of the other flaws in the installation.

BW-NFS provides an option to update the AUTOEXEC.BAT and CONFIG.SYS automatically or edit a separate file with the recommended changes. We still had to replace our IPX command with IPXODI, reorder the way drivers were loaded, and change some network drive assignments. We also had to modify our CONFIG.SYS. The installation program adds a last drive=z statement that prevents access to NetWare.

BW-NFS supplies a sample NET.CFG that contains configuration information for 28 network interface cards — another example of Beame & Whiteside's attempt at a comprehensive package.
Score: Good.

ChameleonNFS was one of the easiest products to install. It automatically backed up the Windows SYSTEM.INI file and updated a new copy. Once all the ChameleonNFS files were completely installed, the program guided us through the configuration options.

ChameleonNFS was the only PC product that couldn't use Open Data-Link Interface (ODI) drivers for NetWare coexistence. If you want ChameleonNFS to work with NetWare, you will need an additional product from NetManage called IPX/Link. IPX/Link provides coexistence through the NDIS. IPX/Link has a replacement for Novell's IPX.COM.

There is no automatic installation program for IPX/Link, but the README file that came with the product explained the manual installation procedure clearly. We had to copy the new IPX.COM to the NetManage directory, change the AUTOEXEC.BAT file to run the new IPX prior to running the Netbind program, and add a few lines to the NDIS PROTOCOL.INI file. Finally, to complete the installation, we had to configure the default user and password in Windows via the Network option in the Control Panel.

At one point we couldn't run certain Windows programs from the File Manager if the program was on the Sun (such as running a copy of Windows Notepad from logical drive D, which pointed to a directory on the Sparc). With the help of the vendor, we traced this to a side effect of ChameleonNFS' inability to use a UDP checksum on fragmented packets. We changed a couple of parameters to shrink the packet size to 1KB — small enough to fit inside an Ethernet packet so that packets would be sent unfragmented. Once we made this change, we no longer experienced problems running Notepad. **Score: Very Good.**

The installation of both the Windows and DOS portions of LAN WorkPlace was performed by a DOS program that looks and feels much like any other Novell installation program — awkward, but familiar. The installation informs you of the files it needs to modify and tells you where the files are located. You can override this option and make the changes yourself. The installation backs up the files it changes (such as Windows' WIN.INI, and SYSTEM.INI) so you can revert back to the originals if there are problems.

LAN WorkPlace came close to making an attempt at a complete installation but left out a few steps. It creates a NET.CFG file if you don't have one. LAN WorkPlace included the Novell LSL and IPX-ODI drivers. The only other product to do so was BW-NFS. It didn't have a driver for our 3C507 network interface card (NIC), however. (BW-NFS did.) You can specify "none of these" when it asks about the network card you're using, but the installation program won't volunteer any information about what to do to install your unlisted network card.

The installation program did not remove or replace our existing instruction in the AUTOEXEC.BAT file to run IPX and NETX. Instead, it creates an extra batch file, which it calls from AUTOEXEC.BAT. This new batch file has a few extras — it logs you into your default file server, for example. **Score: Satisfactory.**

PathWay had the most fragmented installation procedure. There are separate installation programs and additional procedures for each module, and three modules must be installed. The procedure begins by installing PathWay Runtime. Runtime provides the lowest layer support that lets you use TCP/IP on the PC. To choose ODI as the driver, you must first install the ODI software. If it's not already installed, you will have to redo the installation. Like most products, the PathWay program does not include all the necessary drivers.

The Runtime installer is one of the few installation programs that configures the NET.CFG file. After installing Runtime, you are returned to the setup screen, where you can choose to install the DOS portion of PathWay Access. To install the Windows-based applications, you need to run the Wollongong setup program from within Windows. It is also necessary to run the Windows setup program to install the PathWay NFS Network driver. Next, you need to install the NFS client software. You insert the command NFS into the AUTOEXEC.BAT to start the NFS client at start-up time, modify the CONFIG.SYS file to include a LASTDRIVE specification, and you're finally done. The PWSETUP program lets you view and modify your current network setup.

In spite of the multiple steps required, we found the PathWay Access installation went relatively smoothly, because the installation program was explicit and the documentation clear. After Runtime is installed, PathWay offers a replacement program that lets you create a duplicate installation of the product from the network to other workstations. This is a welcome convenience, considering how involved an installation can be.
Score: Good.

DAILY OPERATIONS

With the exception of FTP, the Windows programs are not as easy to use as some of the other products. The only way to send a custom terminal ID to the target Unix system is to add an argument to the Windows program. For example, you would add the option /t=VT100 to the command line in the Telnet program properties in Windows.

The file name mapping in Windows File Manager is not as excessive as in PC-NFS. BW-NFS tends to shorten file

See BW-NFS, page 118

Of all the products tested, ChameleonNFS was one of the easiest to use. You can browse available Unix hosts and directories when you mount a network drive in Windows File Manager and browse through available printers when you connect a remote printer. Windows automatically remounts drives and printers at startup.

There is no way to view the long file names directly from the Windows File Manager.

See CHAMELEONNFS, page 118

As in most other programs, you can attach a Unix drive from the Windows File Manager. You cannot browse hosts and paths. A specific host and path name must be entered manually. LAN WorkPlace implements the commonly used but unintuitive syntax for a host and directory. Like BW-NFS and PathWay Access for DOS, a number of slashes are required: for example, \\unixhost\home.

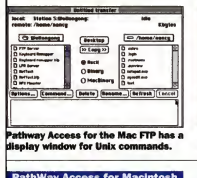
You attach a printer using the Printers selection in the Control Panel. The

See LAN WORKPLACE, page 118

PathWay Access can link a saved session to an icon. That way you can start up a terminal with any set of session options by clicking on an icon. Should you prefer not to clutter your Windows groups with icons, you can open a session with your saved settings by entering into Telnet or FTP and choosing Open Terminal or Open File Transfer Session.

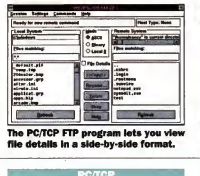
Connecting our host drive and printer from Windows was more difficult than with some of the other products. For ex-

See PATHWAY ACCESS DOS, page 118

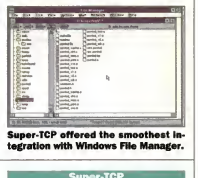


Pathway Access for the Mac FTP has a display window for Unix commands.

The terminal program in PC-NFS is one of the most configurable of the group.



The PC/TCP FTP program lets you view file details in a side-by-side format.



Super-TCP offered the smoothest integration with Windows File Manager.

PathWay Access for Macintosh (Continued)

PC-NFS (Continued)

PC/TCP (Continued)

Super-TCP (Continued)

EASE OF INSTALLATION

Wollongong's PathWay Access for Macintosh was by far the easiest TCP/IP product to install, despite the fact that there was no installation program. The installation guide walks you through the entire process, which is just copy, configure, and go.

We were able to place the files in a folder of our choice, as long as the files remained together in that folder. One of the disks included a folder titled "These go in System Folder." We dragged and dropped the files, and the items were automatically placed in their proper System Folder group, with some going in Control Panels and others in Extensions. You configure PathWay Access from the Control Panel, selecting the protocol for your installation and entering the IP address, subnet mask, and default gateway address.

Wollongong provided a separate NFS product called Client NFS for the Macintosh operating system. The NFS users' guide clearly stated which files went in the System Folder and which files went into our PathWay Access folder. One nice feature of the Macintosh installation is that you can decide program by program which modules to copy over. Further installation can be done at a later date by copying more files.

The NFS configuration was as simple as with TCP/IP. You enter the host name, directory to mount, volume name to appear on the Macintosh desktop, user name, and password. A "More . . ." button is available for further customization, such as file privileges, text file type, etc. When everything is configured, you can click "Mount" to mount the drive to the desktop. We set up the system to automatically mount the drive at system startup time. You do that by creating an alias of the NFS Mounter icon and placing it in the system Startup folder.

Between the inherent simplicity of the Macintosh operating system and the PathWay Access installation procedure and manual, this was much easier than any of the PC TCP/IP product installations. **Score: Excellent.**

We lost confidence in PC-NFS's documentation a little too early (the samples in the documentation belie at least one author's lack of PC savvy), which made installing PC-NFS more difficult than it had to be. The documentation does contain the information you need — if we had read on, we might not have encountered as many problems.

The installation program doesn't perform all the necessary steps to get PC-NFS running along with NetWare, but it does point you to a sample file that will help you finish the configuration yourself. We had to edit the CONFIG.SYS, AUTOEXEC.BAT, and NET.CFG files to complete an installation. We had to supply our own Link Support Layer (LSL), IPX-ODI, and network card drivers. To its credit, the documentation was very explicit on crucial details about editing the CONFIG.SYS and NET.CFG files.

All NFS programs require that a public domain program called pcnfsd (a Unix daemon) is running on the target host. This daemon provides user authentication and remote print services. PC-NFS comes with the latest version of pcnfsd, which you may compile for your operating system or nearest equivalent. This version has a bug that prevents it from authenticating a user if the Sun's internal user ID number is less than 100. User ID numbers can be changed to have higher values, but it's not a trivial change — you have to change the ownership of files associated with the old number. We took the easy way out and reverted back to an older version of pcnfsd. Not everyone will have an older copy of pcnfsd handy, however. The problems we had with pcnfsd hold down what otherwise might have been a better score. **Score: Satisfactory.**

PC/TCP was the most difficult and time-consuming product to install. PC/TCP provides a DOS character-based installation program. The 86-page installation guide provides plenty of technical information on performing a manual setup. There is a six-page installation summary guide for the automatic installation.

The setup program itself is difficult to follow and behaves erratically — FTP's technical support confirms that it can behave unpredictably. There is a step during installation where you are required to reboot, after which the installation should continue automatically. We installed the product several times, and the installation continued automatically only about half the time.

At the beginning of the installation, you are prompted with 13 questions. Online documentation is available at this point. Some questions will be cryptic to all but the most experienced network technicians. (One assumes you know about Kerberos authentication, for example.) Other questions can be misleading. For instance, one question asks if you want to run NetWare client over PC/TCP. This question refers to a technique called Internetwork Packet Exchange (IPX) tunneling and has nothing to do with installing drivers that allow PC/TCP and NetWare to coexist (such as Open Data-Link Interface [ODI]).

The installation program does not update the AUTOEXEC.BAT or the CONFIG.SYS files directly; rather, it creates two sample files in the PC/TCP directory. The installation program edits the necessary Windows configuration files. It even updates the Windows network driver.

The network card driver does not ship with the product, nor do the Link Support Layer (LSL) and IPXODI drivers. To its credit, the installation program will let you browse your hard disk for these drivers in case you already have them. But the browse options are so unintuitive, we aborted the installation to manually locate the drivers. **Score: Poor.**

Super-TCP's installation program has the same inconsistent quality as the documentation. It is superb at some points and falls completely flat at others. It doesn't include or install the Link Support Layer (LSL), network card, or IPX-ODI drivers, but it does tell you about the LSL and IPXODI programs you'll find in your Windows system directory.

A careless error in the documcntation led us astray and made installation much more difficult than it had to be. We found portions of the installation to be very confusing. For example, the installation program lists "LAN OS Coexistence" as an option. We installed this option because we wanted Super-TCP to coexist with NetWare. However, the option is only for use with Network Driver Interface Specification (NDIS) drivers. (We chose ODI instead.) The installation program does not make this clear. It installs the option, but you will get an error message that the NDIS drivers are missing if you try to use it, which could send you on a wild-goose chase to fix something that's not broken.

On the plus side, Super-TCP gets bonuses for providing the means to uninstall individual modules of the product and reinstall others. The installation program will even search your drive for an older copy of Super-TCP. If it finds an older version, it will read and use your current configuration. We found this to be problematic, though. The Uninstall feature did work very well when we used it to reconfigure the same version of Super-TCP, but we had some problems using it to upgrade from an old version.

Super-TCP can be installed to use Windows programs for its TCP/IP handling, or you can install it to use a TSR TCP/IP driver. The former method will save memory, but it will prevent you from using any of the DOS utilities that come with the product. The latter method slows down performance considerably.

Once you have installed Super-TCP successfully, repeated installations are a cinch. **Score: Good.**

DAILY OPERATIONS

Wollongong's PathWay Access for the Macintosh provided the easiest means of mounting drives. It's done via the NFS Mounter program on the Macintosh. One click and the foreign drive appears on the desktop. From there on, you access it like any other Macintosh drive. In true Macintosh style, the long file names survive when viewing the files on the mounted drive. When we copied files to and from the Spare, the file names remained intact. However, the system can be configured See PATHWAY ACCESS MAC, page 119

PC-NFS includes a DOS configuration program that is very handy for mapping drives and connecting remote printers. The connections you make using the configuration program will persist in both DOS and Windows. You can even have PC-NFS make these connections automatically each time you boot the machine.

You can also attach drives from within the File Manager in Windows. PC-NFS lets you browse through a list of available See PC-NFS, page 119

PC/TCP was able to display extended Unix file names in the Windows File Manager, although the feature did not work the way most users would expect. You can use an option to choose between the shorter, mangled file names that fit DOS naming conventions or the extended Unix file names, but the choice won't take effect until you exit File Manager and restart it.

PC/TCP had the only Telnet product that we could not get to pass an alternate See PC/TCP, page 119

One of the places Super-TCP really shines is in how it adapts Windows' File Manager for use with a Unix file system. You can switch easily between viewing Unix files and directories in the mapped DOS format or as long file names, as they would be seen at the Unix machine. Unlike FTP's PC/TCP, the mode switch takes effect immediately. It handles the details of using File Manager well, too. If you copy a file with a long file name from the Unix machine to the PC, it prompts See SUPER-TCP, page 119

BW-NFS (Continued)	ChameleonNFS (Continued)	LAN WorkPlace (Continued)	PathWay Access for DOS (Continued)

DAILY OPERATIONS

names and add one tilde (for example, LONGFILE.~E1), whereas PC-NFS adds more nonalphabetic characters.

You can browse through a list of available directories on the Unix system (based on a file called exports on the Unix host). The correct network path is automatically inserted. Similarly, you can browse through available remote printers when attaching a printer.

During an FTP transfer, the program offers an informative visual display of the status of a file transfer. Both a thermometer and a colorful pie chart indicate the degree of completion of a file transfer. BW-NFS provides drag-and-drop icon-based file manipulation in FTP. The BW-NFS FTP program, although similar, isn't nearly as powerful as Novell's. You can't prune and graft directories, for example. There are at least three ways to change directories in the FTP module. When we attempted to copy longfiles.test to our local PC, we received an "Invalid DOS file name" error, and we were prompted to enter a new name. Unlike other products, it did not attempt to create a DOS-compatible name for us.

If you attach a remote printer in Windows, exit Windows, and then start Windows again, you get a harmless but annoying error message. The only way to avoid the message is to detach the printer each time you exit Windows— it will be reattached automatically when you start Windows again. We also experienced General Protection Faults when we set the terminal emulation to use default settings several times during a Telnet session.

BW-NFS supplies some interesting utilities to assist in locating servers on the network. The Troute utility lets you track your packets across gateways, for example. **Score: Satisfactory.**

The ChameleonNFS FTP program has a point-and-click interface. ChameleonNFS can be set up to rename files to DOS conventions automatically when copying them from the Unix host to the local PC or to have the system prompt for a legal file name. If the process is automated, the system places an exclamation mark as the first character of the file name and shortens the remainder of the name to fit the 8.3 DOS format (eight characters for the file name, three for the extension). This method may be more likely to cause duplicate file names than some of the file name mapping alternatives, but it is friendlier than some other products' default mapping methods.

One of the best features of ChameleonNFS is the capability to automate some common procedures. You can set the PING program to check a specific host every time you run it. Similarly, ChameleonNFS lets you store frequently used information for use with FTP and log in to the host automatically the next time you run it.

ChameleonNFS' terminal program could not identify itself to the Unix host with different terminal IDs, such as VT-100 or DEC-VT100. The host also did not recognize the default terminal identifier, you must change the host environment settings or edit the termcap file on the host.

The only serious disadvantage we found in ChameleonNFS is the inability to use its features in DOS even when you shell out to DOS from within Windows. For some this will preclude a ChameleonNFS purchase. For those who use Windows as their primary operating environment, it will be an occasional inconvenience. **Score: Good.**

browse button is grayed out, so you can't list available printers. You must enter the host and printer name manually. LAN WorkPlace has an unusual limitation that had us baffled for days. The Windows portion of LAN WorkPlace will not recognize a logical printer name on the Unix host if it is greater than 12 characters long or if it contains any uppercase characters. Once the drive has been mounted and the printer attached, the system automatically reattaches them each time you start Windows.

Novell's terminal program identified itself to the Sparc as a "DEC-VT100." The Sun Sparc doesn't recognize this ID by default, but it can be changed by modifying the properties on the Host Presenter icon to add /TERMTYPE=VT-100 as an argument to the executable file.

The Windows FTP program was the easiest of the PC products to use and had the nicest set of features. Unlike in most other products, tiles and directories are represented as icons. You can drag and drop files and prune and graft directories. We also like the fact that it lets you view and manage two remote directories at once. Rapid Filer can recognize ASCII and binary files and transfer them to the proper mode without user intervention. You can also specify the type of transfer manually. Rapid Filer can be configured to suggest a legal DOS file name when you attempt to copy a file from the Unix host that doesn't conform to DOS file name conventions. Much of the design is sorely lacking in convenience features, such as the capability to recognize most printer names and browse for hosts, directories, and printers. Rapid Filer is the oasis in the design. **Score: Satisfactory.**

ample, we were unable to browse network connections in the Print setup option in the Control Panel. PathWay used the same awkward syntax for a network path as BW-NFS and LAN WorkPlace. It included a number of slashes, as in \\hostname\printer. When you make drive A or a printer connection permanent in Windows, you will need to enter a password each time you enter Windows. Unlike two of the products we tested, PathWay Access does not display extended file names in File Manager. The file mapping uses one of the more cryptic algorithms, which makes it difficult to recognize files in their mapped DOS format.

The default terminal ID is DEC-VT100, but you can change that to VT-100 and save the terminal session to a file on an icon in order to make the change permanent.

The FTP program is flexible. You can associate file extensions with file types. You can specify that all files with the extension .TXT should automatically be transmitted as ASCII, for example. When transferring our file longfiles.test from the Sun to the PC, we were prompted with a valid DOS file name, longfile.tes. We could accept this name or create a different DOS name. **Score: Satisfactory.**

SUPPORT POLICIES

Beame & Whiteside provides free unlimited technical support via fax, telephone (not toll free), and the Internet. An evaluation version is available. Maintenance agreements are available that include free upgrades. **Score: Very Good.**

NetManage offers 90 days of free support on a toll line from 7 a.m. to 6 p.m. Pacific time, Monday through Friday. Support is also available via fax and the Internet. NetManage offers a 60-day money-back guarantee. **Score: Very Good.**

There is no free support. Novell offers toll-free 24-hour support, seven days a week, for a charge of $20 per incident. Support is also available via fax and informally over the Internet and CompuServe. **Score: Satisfactory.**

Wollongong offers 30 days of free support on a toll line during business hours (Pacific time). Fee-based support services are available. You can get support by phone, fax, Internet, or BBS. **Score: Satisfactory.**

TECHNICAL SUPPORT

Staff members were knowledgeable and answered all our questions. When we left messages, calls were returned the same day. In addition, we were typically on hold for less than 2 minutes. **Score: Satisfactory.**

Calls were typically returned the same day. When we did speak with technicians, they were generally knowledgeable and able to answer questions right away. **Score: Satisfactory.**

Novell was quick to respond to our calls. It didn't know about the command-line switch to change the terminal ID from "DEC-VT100" to "VT100"; the staff told us to reconfigure the Sun Sparc instead. **Score: Satisfactory.**

We either reached a technician right away or we waited on hold for a few minutes and left a message. They returned all our calls within 1 hour. The technicians were knowledgeable and often provided alternative ideas. **Score: Very Good.**

VALUE

At $349, Beame & Whiteside's BW-NFS is the least expensive product in the comparison. BW-NFS slips up in a few places — it could coordinate its DOS and Windows printer connections a little better, for example. BW-NFS is the only product to supply all the ODI drivers we needed to get NetWare Internetwork Protocol Exchange to coexist with TCP/IP. BW-NFS even supplied our network card driver. **Score: Very Good.**

ChameleonNFS is a worthy contender for about $650 ($495 for ChameleonNFS, $150 for IPX/Link), but beware — if you need to use TCP/IP from DOS and Windows on the same machine, any version of Chameleon will be useless to you. It's also the most restrictive in that you need to use NDIS for NetWare compatibility. We especially like the heavy reliance on Windows programs instead of DOS TSR drivers. **Score: Good.**

The unusually narrow rules that LAN WorkPlace imposes on remote printer access in Windows are very disappointing. If you don't mind, LAN WorkPlace will prove itself worthy of its $700 price tag ($399 for LAN WorkPlace for DOS and $295 for NFS Client).

The support may not be free, but we think it is worth $20 per incident to be able to call around the clock, seven days a week. **Score: Good.**

For just over $600 ($350 for PathWay Access for DOS, $265 for Client NFS), PathWay Access won't give you a rich set of DOS and Windows utilities, but it supplied everything we needed. It has an above-average FTP program and speedy terminal emulation. We really like the feature that lets you replicate installations from the network. **Score: Good.**

Beame & Whiteside Software Ltd., in Dundas, Ontario, Canada, can be reached at (416) 765-0822.

NetManage Inc., in Cupertino, Calif., can be reached at (408) 973-7171.

Novell Inc., in Provo, Utah, can be reached at (801) 429-7000.

The Wollongong Group Inc., in Palo Alto, Calif., can be reached at (800) 872-8649; in California: (800) 962-8649.

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PathWay Access for Macintosh (Continued)	PC-NFS (Continued)	PC/TCP (Continued)	Super-TCP (Continued)

DAILY OPERATIONS

to prompt you to change the file name if it is required.

It was a simple point-and-click operation to transfer files to and from the Sun. For the most part, file names remained intact. The FTP program will prompt you for a new name if the length exceeds the Mac limit of 32 characters. The system also prompts you before overwriting any existing files.

Wollongong's Telnet program identifies itself to a host as a DEC VT-100 by default. There's an option to modify this identifier to whatever the host expects as an ID for a VT-100. You can save the Telnet session and restore it later to reuse this and other settings.

Most products use a Hosts file to associate long and short alias names (such as NANCY.IFW.COM and NANCY) with numeric IP addresses so that you can use simple names to communicate with others instead of typing in the numbers. Normally, you store the long and short aliases and the IP address as one entry. PathWay Access makes you create a separate entry for each alias.

PathWay does not make remote printing transparent, as the PC products do. You have to print to a file from your application and then use their utilities to run a special printer session to print that file. That was the least of our problems, however. Even after substantial help from the vendor, we could not get the print feature to work. We could get the program to spool the file to the Sun, but we could not get it to print on the SunPics NewSprinter20 PostScript printer. The vendor did not have access to a SunPics printer to help troubleshoot the problem. The extra steps required and the inability to print to our printer brings down an otherwise favorable score. **Score: Poor.**

hosts. When you choose a host, you can then browse through a list of exportable file systems (directories you are allowed to access). You can also browse through a list of the most recently used host and directory combinations. These were among the best browse features of the products we tested — only FTP's PC/TCP rivals them.

There was a similar browse capability for selecting a remote printer. You connect to a remote printer via the Print option in the Windows Control Panel. You may select from a list of available hosts, and then from a list of available printers on that host.

You cannot make the Windows File Manager display Unix files and directories with their long names. The DOS file name mapping adds a number of tildes and random characters to the name. Because some characters are picked at random, you can't count on it choosing the same name for a file each time you use it. PC-NFS documents a switch you can put in your CONFIG.SYS file that lets you substitute your own choice of character for the tilde.

Another CONFIG.SYS driver switch claims to disable the mapping of file names to fit DOS conventions, but the feature is so limited it's essentially useless. It does not display long names, it only accepts commands using long names. It works on long names only if they are composed of all alphabetic characters in lower case; consequently, it failed when we tried using it on many of our files and directories.

The terminal program has more configuration options than we could ever imagine using. We noticed that the terminal occasionally left stray characters on-screen that should have been erased during the cursor movement benchmark. **Score: Satisfactory.**

terminal ID to the host, with the exception of ChameleonNFS. You must modify a configuration file on the Sun Sparc or set an environment variable on the Sparc to match the ID used by PC/TCP. The Windows terminal emulator supports ANSI, TN3270 (only from DOS), VT-52, VT-100, and VT-220.

There are two ways to attach network drives to File Manager. You can use the normal File Manager Network menu option, or you can attach drives outside of File Manager using a network control program included with PC/TCP. The network control lets you map net drives, attach printers, and even manage print queues.

It's a breeze to add and maintain network connections under Windows. Existing hosts and exportable directories are always displayed, so you do not have to know details about the remote hosts to access them. Connections you make within Windows are not lost when you exit Windows — you can continue to access them through DOS.

PC/TCP's FTP has quite a few useful and unique features. There is a file details check box that displays information on file size and date. There is also an option to log and report file transfer times. **Score: Good.**

you with a file name trimmed down to DOS size, which you can then edit to your liking. There's one inconvenience, however. You cannot run programs from the File Manager when it is set to use long file names, even if the program you are trying to run is a DOS or Windows program that meets DOS file name conventions.

If you install Super-TCP for Windows-only operation, you can't attach drives or printers from DOS or use any DOS utilities. Surprisingly, however, you can run Windows, jump out to an MS-DOS window, and still access any drives or printers you attached from within the Windows environment.

When you attach a drive in Windows, you can supply the host name and Super-TCP will let you browse through the directories that you can access on the target host. Super-TCP won't query a host for existing remote printers, but you can enter and save a list of remote printers and browse through that list later from the Windows Control Panel. This is not as convenient as full browse features.

Super-TCP's File Transfer Protocol (FTP) program is simple to use, but it has one annoying feature: It pops up a distracting work-in-progress dialog box during almost every operation.

The Telnet program lets you pick fonts and colors and will adjust the size of a font automatically if you resize the window. This is a great feature, but we found it difficult at first to adjust the fonts and window size to get the look we wanted.

There is a Windows-based TCP/IP engine that must be running to use Super-TCP from Windows. This program supplies valuable information about activity on the network and services running on various hosts. **Score: Very Good.**

SUPPORT POLICIES

Wollongong offers 30 days of free telephone support on a toll line from 6 a.m. to 5 p.m. Pacific time, Monday through Friday. Support is also available via fax and BBS. **Score: Satisfactory.**

The product includes 90 days of free support during regular business hours on a toll-free line. CompuServe and fax support is available. There is a 30-day evaluation period. **Score: Very Good.**

FTP provides free unlimited technical support via an 800 number, fax, the Internet, and BBS. The unlimited money-back guarantee requires a $50 restocking fee. **Score: Excellent.**

Super-TCP comes with 90 days of free support during regular business hours, Central time, on a toll line. There is private BBS, fax, and Internet support. They have a 30-day evaluation period. **Score: Good.**

TECHNICAL SUPPORT

Wollongong was quick to respond to our calls. The staff was knowledgeable and professional and went to great lengths to find answers to our difficult questions. **Score: Very Good.**

Technical support was courteous and helpful. They returned our calls promptly. They were quite knowledgeable about their product and solved most of our problems almost immediately. **Score: Very Good.**

We got through to technical support right away. They often researched our problems in depth and called us back with added information. **Score: Very Good.**

Technical support called us back about 3 hours after we placed our calls. The technical support person was knowledgeable and polite. **Score: Satisfactory.**

VALUE

As much as we like PathWay Access for the Mac's simple installation and ease of attaching drives and copying files, you don't get much bang for the 600 bucks ($295 for PathWay Access for the Mac and $295 for Client NFS). Wollongong is depending on Apple to supply most of the standard TCP/IP utilities such as PING. It's also too much trouble to print to a file, another factor that brings down its overall value. **Score: Poor.**

PC-NFS lists at $415 for a single-user license, media, and documentation. Site licenses are available. The documentation says PC-NFS will run in 4MB of RAM, but you will have to play with the product to get it to work. It is the only PC product that lacks E-mail, which SunSelect sells separately. There are minor wrinkles, but PC-NFS stacks up as a comprehensive product. **Score: Very Good.**

For $400, FTP offers more for the money than most of the competition. It is one of the easiest products to use for connecting network drives and remote printers. You have to be a network guru to understand its installation program, but fortunately, its technical support is quick on the trigger and very knowledgeable. **Score: Very Good.**

If Windows operation is what you are after, at $495, Super-TCP will give ChameleonNFS a run for its money. With only a few minor exceptions, it integrates with Windows better than any other product we tested. Unlike ChameleonNFS, you can get it running on both DOS and Windows on the same machine. There is a catch: Windows performance goes down the drain when you install it for both. **Score: Very Good.**

The Wollongong Group, in Palo Alto, Calif., can be reached at (800) 872-8649; (800) 962-8649 in California.

SunSelect, in Chelmsford, Mass., can be reached at (800) 247-3532.

FTP Software, in North Andover, Mass., can be reached at (800) 282-4387.

Frontier Technologies, in Mequon, Wis., can be reached at (414) 241-4555.

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TCP/IP NFS

	BW-NFS Version 3.0	ChameleonNFS Version 3.10	LAN WorkPlace Version 4.1	PathWay Access for DOS Version 2.1.1	PathWay Access for the Macintosh Version 2.1.1	PC-NFS Version 5.0	PC/TCP Version 2.2	Super-TCP Version 3.0
Network utilities								
E-mail	Yes	Yes	No	Yes	No	No	Yes	Yes
MIME extensions	No	No	No	No	No	No	No	Yes
Finger	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
File transfer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PING	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Talk	Yes	No	Yes	No	No	Yes	Yes	Yes
Telnet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote utilities								
Copy	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Execution	No	No	Yes	No	No	No	Yes	Yes
Log-in	No	No	No	Yes	No	No	Yes	No
Shell	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Other utilities								
DOS to Unix	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Unix to DOS	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
List (Unix DIR)	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Move (Unix RENAME)	No	No	No	No	No	Yes	Yes	No
Change mode	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Change owner	Yes	No	No	Yes	No	Yes	Yes	Yes
Terminal emulation								
ANSI	No	Yes	Yes	Yes	No	Yes	No	No
TN3270	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
VT-52	Yes	Yes	Yes	No	No	Yes	Yes	Yes
VT-100	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VT-102	No	No	Yes	No	No	Yes	No	Yes
VT-220	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VT-320	No	No	No	Yes	Yes	Yes	No	Yes
Protocols								
Bootp	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
PPP	No	No	Yes	No	No	No	Yes	Yes
RARP	Yes	Yes[2]	Yes	No	Yes	Yes	No	Yes
RFC NetBIOS	Yes	No	Yes	Yes	No	Yes	Yes	Yes
SLIP	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
SNMP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SMTP	Yes	Yes	No	Yes	No	Yes	Yes	Yes
X.25	No	No	Yes[2]	No	No	No	Yes	Yes
Driver types[3]								
ASI	No	No	Yes	Yes	No	No	Yes	Yes
NDIS	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
ODI	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Packet	Yes	No	Yes	Yes	No	Yes	Yes	Yes

[1]For developers only.
[2]Via ODI only.
[3]These are the driver types supported. Specific driver programs may not be included.

Text retrieval — Windows file indexers

Text retrieval software is undergoing a dramatic evolution.

TEXT AND TASK DEVELOPMENT BY **PATRICK MARSHALL**
CONTRIBUTING EDITOR

EDITED BY **PEGGY WATT**

In previous *InfoWorld* comparisons, text retrieval programs fell largely into two camps: file indexers and text databases. File indexers index the contents of separately existing DOS files and search and retrieve those files. By contrast, text databases import text and let users create any number of records out of a single file. With a textbase such as AskSam or Folio Views, you could create records out of individual paragraphs if you wanted to search for a data "bite" that small. Textbases also generally let you edit records on the fly, as well as link information in diverse ways.

Recent years have seen these categories refined through ease-of-use features, additional search capabilities, scanning interfaces, and other enhancements.

New types of applications have also appeared. In the last year, *InfoWorld* has begun examining yet another category of text retrieval software: document managers. These programs track files — including spreadsheet, database, integrated files (which may contain graphical elements or links to graphics as well as text), and simple text files — across networks and can generally retrieve not only the text of documents but images of them as well.

In addition, programs such as Folio Views 3.0 and HyperWriter have pushed textbases into the realm of electronic publishing. At the same time, Lotus Notes — previously considered a groupware E-mail communications system — has in Version 3.0 added such robust search and retrieval tools that it warrants being included in the text retrieval category. Many of the packages let authors — both of on-line creations and CD-ROM publications — create hyperlinks, generate menus and tables of contents, and incrementally update distributed textbases.

File indexers, integrated textbases, electronic authoring tools, and multiplatform document retrieval programs share the fundamental objective of text search and retrieval. But they differ significantly among the types of searches they allow and what tools they provide to work with the retrieved text. According

See TEXT RETRIEVAL, page 140

Executive summary

Each of the programs in this comparison has its strengths and is a worthy choice for users with particular needs.

Isys, the highest scoring product, is a strong choice for users who want a combination of powerful search tools and ease of use. Isys also has a clear edge if you want to access indexes across a network. It is easy to install and provides a host of network tools for monitoring and controlling accesses.

ZyIndex for Windows is on par with Isys in strength combined with ease of use. ZyIndex does the best job of compressing indexes — not a minor consideration if you are short on disk space — and no program makes index creation easier.

Personal Librarian, whose final score almost ties with ZyIndex, is the all-around powerhouse in this comparison. In addition to having some of the best retrieval speeds and accuracy rates, Personal Librarian offers special tools that most of the others do not. Specifically, the program can parse large text files into multiple records, and it's the only program that lets you to enter true data fields into records. You can limit searches to data fields and also sort search results according to the content of specified fields.

Personal Librarian's only major weakness is its Administration module, which is used to create and update indexes. The utility is awkward, especially if you need to eliminate or modify records already in the index.

dtSearch is a bargain hunter's find. For $99 you would not expect half the power this program provides. You still must take into consideration dtSearch's drawbacks, however: It is capable of only basic searches, is relatively limited in capacity, and lacks the capability to link graphic files to records.

Sonar Professional is notably slow and an awkward program to use. But it also offers some unique search tools, and it is the only program other than Personal Librarian that can perform automatic relevancy ranking and lets you parse large files into multiple records.

Evaluating Windows file indexers with real-world tasks

We designed our test plan for file indexers with real-world tasks in mind. Our task list takes you through installing and configuring the program, creating an index, searching for records, and printing search results to disk or a printer. We also included three other categories: networkability, speed, and accuracy in searching. The test data was 55MB of *InfoWorld* articles, averaging 45KB in size and residing in more than 100 subdirectories. As is now standard for a task-oriented test plan, we incorporated evaluations of the ease of use and learning into the tasks themselves.

Our test platform was a 66-MHz 486 system with 16MB of RAM and a 640MB hard drive. We conducted our peer-to-peer tests on two 66-MHz 486 systems with 340MB hard drives.

PERFORMANCE:

Installation and configuration: In this task we performed what is ideally a simple chore. To receive a score of satisfactory, a program must install properly. For a score of good, the program must not require the user to manually edit any configuration files, and it must not present any other notable obstacles to installation. To receive a score of very good, the program must also be easy to install on a network, whether it is peer-to-peer or is based on a dedicated server.

We awarded bonus points to programs that made installation unusually easy or offered options to customize the interface or operations.

Textbase creation: In this task we followed the program's procedures for creating a textbase using our sample set of 55MB of ASCII text files. We tried to parse files into multiple records, link a graphics file to a record, and edit indexed records (which required using outside programs). We also attempted to add files to the index — including formatted files from Windows word processors — to test how easy it was to update the index and whether the program could handle the file formats.

To test the program's stability, we cut power to the system during indexing and checked to see whether program or index files were corrupted. We also tried to create new data records from scratch. Finally, we attempted to scan material directly into the program.

To receive a score of satisfactory, a program had to index ASCII files with reasonable ease and prevent file corruption when we interrupted the power during the operation.

For a score of good, the program had to make it easy to update its indexes. The program also had to let us link graphics images to records and support the file formats of major word processors.

We awarded bonuses to products that performed with particular ease and provided additional capabilities.

Search capabilities: In this task, we examined the capabilities and ease of use provided by each program. First we executed five basic searches: wild card, Boolean, nested Boolean, proximity, and phrase.

Next we tried to recall one of the search queries, edit it, and perform a new search with that argument. Then we tried conducting a progressive search — one that operated only upon the results of the previous search. Finally, we used the program's tools to locate a particular file among the search results, called up the file, and searched for the first occurrence of a "hit" within the file.

To receive a score of satisfactory, a program had to be able to perform basic Boolean searches and either wild-card searches or some form of fuzzy search that allows searching for variants.

We awarded extra points to programs that provided additional ease-of-use features, such as menu-driven argument construction, permanent search catalogs, synonym lists, table of contents creation, and the capability to search across multiple indexes at once. We also awarded bonus points for additional search tools, such as relevancy ranking, direction proximity searching, and quorum searching.

Data output: In this task we attempted to perform a variety of outputting operations, including saving the selected records to an external file, saving a passage from a record to an external file, appending text to an existing file, cutting and pasting to another Windows application, and printing formatted reports.

To receive a score of satisfactory, the program had to be able to print selected records and use the Windows clipboard to move text into other Windows applications. To receive a score of good, the program also had to be able to save records to disk.

We awarded extra points to programs that provided additional output controls and features, such as tools to distribute databases, CD authoring tools, and the capability to create hyperlinked menus.

To receive a score of excellent, the program also had to provide Object Linking and Embedding or Dynamic Data Exchange links.

Networkability: In this task, we put each program through several operations to test its network capabilities. To test concurrent access, we tried to call up a record already being used on another workstation. To test concurrent indexing, we set the host system to work reindexing the textbase while we attempted to search the index from client systems.

We also examined each program's network administration features, including capabilities for creating network logs, assigning password access to database features, and distributing index and program files to maximize performance.

We also performed a "crash test" by interrupting a client's search of an index on a server, and checked file and data integrity.

To achieve a score of satisfactory, the program had to provide concurrent access to data. We awarded bonuses to programs that allowed concurrent indexing and could generate a log of network accesses. To receive a score of excellent, the program had to also let the network administrator control access to the program's features by assigning passwords.

See HOW WE TEST, page 140

REPORT CARD — INFO WORLD

Text retrieval: file indexers

Criteria	(Weighting)	dtSearch Version 2.0	Isys for Windows Version 3.0	Personal Librarian Version 3.0	Sonar Professional Version 2.0	ZyIndex for Windows Version 5.0
Price		$99	$395	$995	$795	$395
Performance						
Installation and configuration	(75)	Good	Good	Good	Poor	Satisfactory
Textbase creation	(100)	Satisfactory	Very Good	Satisfactory	Satisfactory	Good
Searching capability	(125)	Satisfactory	Very Good	Excellent	Good	Very Good
Data output	(100)	Satisfactory	Good	Good	Very Good	Good
Networkability	(100)	Satisfactory	Excellent	Good	Poor	Satisfactory
Speed	(75)	Satisfactory	Excellent	Very Good	Poor	Very Good
Accuracy	(100)	Satisfactory	Very Good	Very Good	Satisfactory	Good
Capacity	(100)	Satisfactory	Very Good	Very Good	Satisfactory	Excellent
Documentation	(75)	Satisfactory	Very Good	Poor	Satisfactory	Good
Support						
Support policies	(25)	Very Good	Excellent	Satisfactory	Satisfactory	Very Good
Technical support	(25)	Satisfactory	Very Good	Satisfactory	Poor	Satisfactory
Value	(100)	Very Good	Very Good	Good	Satisfactory	Good
Final score		**5.4**	**7.7**	**6.5**	**4.7**	**6.5**

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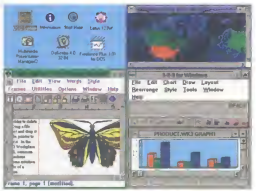

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IBM

dtSearch
Version 2.0

dtSearch has two important virtues: simplicity and low cost. And for a program with its price, it has surprisingly high functionality. For example, it is one of the few programs that provides relevancy ranking and also lets you sort retrieved files. In addition, dtSearch is the only program in this comparison that will search unindexed files.

On the other hand, dtSearch cannot match the most expensive programs' features sets. Its search tools are more or less limited to Boolean, wild-card, and proximity searches. The program does not let you attach images or notes to records, nor can it segment large files into multiple records.

It works well enough on a network, but users cannot update records concurrently. And compared to the big (and more expensive) guys — Personal Librarian and Sonar — dtSearch's indexes are limited in capacity.

In sum, if your indexing needs are basic, dtSearch offers a functional and inexpensive solution. But this program lacks some of the power and flexibility of the other indexers in this comparison.

Isys for Windows
Version 3.0

By bringing Isys to Windows, Odyssey Development Inc. has introduced a product that should give competitors a lot to mull over. Although the program is new to Windows, it offers arguably the most attractive interface of any indexer in this comparison. More than looks, the program's implementation of icons, scroll bars, and dialog boxes makes it decidedly easier to use.

In particular, Isys should give ZyLab's ZyIndex for Windows a real run for its money, because it sports roughly the same features set and the same price tag — $395. Isys does not yet have the market presence of ZyIndex, but its ease-of-use features are just as impressive. Isys offers a bit more functionality than ZyIndex, particularly in its capability to sort retrieved files and its control over network use of the program. Other highlights include Isys' nifty menu for building search arguments, and the program's capability to index zipped files.

On a stand-alone machine, Isys and ZyIndex run close together in speed, but Isys pulls ahead when used over a network. This is, in short, a stellar first release for Isys for Windows.

Personal Librarian
Version 3.0

When it comes to pure power, Personal Librarian is unbeatable. Version 3.0 doesn't get fancy with frills, but its search tools sport lots of extras, including a very effective implementation of relevancy ranking. Personal Librarian offers several distinctive features that are lacking in the rest of the pack. It is the only program in this comparison that offers true data fields and lets you sort retrieved records according to the contents of specified fields. It is one of the two programs (along with Sonar Professional) evaluated here that are designed to handle very large files parsed into multiple records.

Personal Librarian was clearly designed for heavyduty network use. Not only does it allow concurrent access, but users can access the index even while it is being updated on the server. Personal Librarian lets you parse index files for distribution, and you can install on client systems only the portions of the program that are needed.

Unfortunately for individual users, ease of use in creating and maintaining indexes was clearly not a priority in Personal Librarian's design. The usually simple act of designating files to index can be a tedious and frustrating experience with this program, and so is the process of eliminating or editing indexed files.

On the plus side, if you only need Personal Librarian's search module, you will find it quite easy to use, and it is equipped with powerful tools to quickly find the records you want.

PERFORMANCE: INSTALLATION AND CONFIGURATION

Installing dtSearch presents no significant hurdles. The routine is automated and easy to follow.

Installing and configuring the program for network use is also easy, although the process does not optimize dtSearch for use on a network by providing features to support multiple users. You install a complete copy of the program on each node and use the Recognize Index command to locate indexes on network drives. **Score: Good.**

Installation is fast and nearly completely automatic for a single-user configuration.

Isys will automatically install a macro that gives access to the indexer from within Word for Windows. When in Word, you can simply highlight a word or phrase, hit the new Query button on the Word toolbar, and Isys will load and perform the search. The same Dynamic Data Exchange technology lets you also link Isys with Ami Pro, but the link does not automatically load.

Installing the program on a network is also easy, although the manual is not clear. For example, it does not specify where on the network to Install Isys. In fact, all you have to do is install the program on the server, then load the network license disk (purchased separately), which modifies the program to allow multiple users.

Unless you use a dedicated server network that assigns identical drive letters across the network, you will want to place all your data files in a subdirectory under Isys so the program can find them. The data can be anywhere on the network, but the mapping must be the same for all clients.

One significant problem we encountered was that the program assumes your ASCII files have a .TXT extension. If they don't have that extension, when you try to print a file you will get an error message saying the program cannot find the file. The only solution is to add an association in the WIN.INI file. **Score: Good.**

Basic installation and configuration is simple and straightforward. All three modules — the Search program, the Database Administrator, and the Graphics Viewer — are installed automatically, and Personal Librarian creates icons and places them in a new group.

If you vary from the default configuration, however, you may find yourself perusing the manual's back pages and manually editing .INI and other configuration files. For example, getting the program to work with an external graphics program to display images requires you to manually edit the WPL.INI file.

Installing Personal Librarian on client systems is nearly as easy. Because the program is composed of several modules, the network administrator need install only the modules each user requires. Most clients, for example, need only the Search module.

The network administrator must ensure that the index files on the server are in a directory shared across the network, and that this directory is specified in each client's DEFAULTS.CPL file.

Personal Librarian's index files are also intentionally modular, so they are flexible for those distributing databases on slower media, such as CD-ROM. Partitioning portions of the index files can boost retrieval speed, especially if you install the dictionary and display configuration files on the local hard drive, leaving the rest of the program on the CD-ROM. **Score: Good.**

PERFORMANCE: TEXTBASE CREATION

Creating simple indexes is easy, even though dtSearch does not provide high-end structuring tools such as file parsing, links between text records and graphics, or direct input of text by scanner or keyboard. dtSearch does not let you structure the index with a table of contents, hypertext links, or by other advanced means.

The program provides two methods of performing our first subtask: basic and advanced. The basic method is a two-step way to build an index. First you create an empty index file. Then you fill the index file by plugging text files into it.

The only difference in the advanced method of creating an index is that you specify a path for the index files and you can instruct the program to build a compressed archive of all searchable text files.

Once you have assembled the files into an index, you can add documents to it by selecting the Add Documents to Index option on the Index menu. A pop-up di-

See DTSEARCH, page 128

Creating a textbase in Isys is simple. When you call up the Utilities module and select the menu option to create a textbase, the program prompts you to indicate file types and specify directories to be indexed.

Isys can index virtually any type of word processor file format, as well as dBase, spreadsheet, and even PKZip compressed files. (All files within a single zip must be in the same file format.) Isys does not, however, retain the files' character and page formatting.

As a default, Isys uses an editable stop list of more than 300 common words.

The program does not have a scanner interface and cannot accept scanned text directly into the database. Nor does Isys let you edit files directly except to add annotations. You can simply click on an icon in the Query module's toolbar, however, to launch the file's parent application with the file loaded. If you edit the file, you must update the index to reflect the changes.

See ISYS, page 128

Personal Librarian's Database Administrator module betrays its network orientation: Its tools to create an index are powerful, but they are not particularly easy for end-users to understand.

Indexing our 55MB of text files was uncomplicated in principle but unnecessarily tedious in practice. Instead of simply tagging directories of files — as all the other indexers allow — Personal Librarian requires you to highlight each file you want indexed. Personal Librarian could only handle the first 1,500 files we tried to index. This was apparently a limitation of the Windows dialog box, which can store only 64KB of file information at a time. Personal Library is writing a fix for this. However, even after we dropped the number of files to index, Personal Librarian took four passes to index them all. When reindexing for our network installation, we frequently encountered errors but eventually succeeded.

Personal Librarian accommodates only WordPerfect

See PERSONAL LIBRARIAN, page 128

Sonar Professional
Version 2.0

Sonar is a peculiar program in many ways. The first thing users will notice — after the distinctly Macintosh-like touches in the interface — is the fact that the program offers two distinct levels of indexing. "Standard" indexing results in painfully slow search times but lets you incrementally update the index. "Super" indexing results in relatively fast search times, but changing anything in an indexed file requires reindexing the whole directory.

Neither type of index is small; we found Sonar's index files were a bit larger than the size of the files they indexed, although Virginia Systems Software Services Inc. reports that the indexes are usually the same size and sometimes smaller. Unlike other programs, Sonar stores its index files with the data files rather than with its program files. This method makes it particularly easy to set up the program for network use because you need only install the program on a client and point it to the directories containing the data.

Sonar also offers one of the most robust sets of search tools available, including the capability to perform phonetic searches. The cost is a relatively high price tag and a long learning curve. There's no getting around the fact that this $795 program is the most difficult to learn and use of any product in this comparison. Its search syntax is unnecessarily complex, maneuvering files can be difficult, and creating indexes can be downright frustrating. It also tends to be slow. In short, Sonar probably will not be your first choice. If you do buy it, it will be because of one of its special features and despite its inconveniences.

PERFORMANCE: INSTALLATION AND CONFIGURATION

Virginia Systems uses an irritating method of guarding against multiple installations of its program. When you install Sonar, a switch is set in the program disk that will prevent the application from being installed again until it is uninstalled.

We had to reinstall Sonar several times before it would boot correctly. Assuming your Install program works properly, the process requires little input, and Sonar automatically creates its own Windows group.

The program also provides understandable and effective controls to configure the interface. However, the vendor verified that Sonar does not identify some fonts.

You can also set the program to display pop-up windows with various aids, including a button bar for quick access to program commands. Sonar will remember the presence and arrangement of those windows the next time you boot up.

Virginia Systems provides no information — either in the manual or during the installation routine — on network installation. We ran into several glitches trying to get set up. Specifically, we encountered sharing violations when trying to access the index on the server from the client. We were never able to get the program to perform on our peer-to-peer network with our full textbase of 55MB, although we did get it to work with smaller textbases. **Score: Poor.**

PERFORMANCE: TEXTBASE CREATION

Creating a textbase in Sonar can be simple — or an exercise in frustration.

If you are indexing only a few megabytes of files in a single directory branch, the process is easy. But if you have many megabytes of data stashed in numerous subdirectories, you could be in for big-time trouble. You can specify an entire branch, including all its subdirectories, but you must index all the subdirectories — you cannot tell it to ignore some of them.

Also, to create SuperSetup indexes, the program must first create standard indexes. You can perform both indexing routines in a single pass, but Sonar's index files are so large — more than 100 percent of the size of the text indexed — that you need lots of room on your hard disk to perform an indexing routine. When processing our 55MB of text files, Sonar created more than 70MB of .RDI files, its standard index files. It also created 67MB of .SDI files, the SuperSetup indexes. You can eliminate

See SONAR PROFESSIONAL, page 129

ZyIndex for Windows
Version 5.0

When it first emerged under Windows, ZyLab's ZyIndex set new standards for combining ease of use with power. ZyIndex is still among the strongest indexers and one of the easiest to use, but the competition has gotten much tougher.

Every stage of building, maintaining, and using indexes in ZyIndex is clearly designed with ease of use in mind. You can update indexes quickly and automatically, the program's search aids are a paradigm of efficiency, and navigating through search results is easy and intuitive.

One of ZyIndex's weak points is its lack of features for network users. It was extremely difficult to get the program to work properly on our peer-to-peer network, and it provides no special network tools to do such things as assign passwords or maintain usage logs. The other notable knock on ZyIndex is that it provides no relevancy ranking of search results.

If your text retrieval needs do not require the network features or relevancy ranking, you will find ZyIndex hard to beat for its combination of power and ease of use.

Installing ZyIndex is very simple and involves only two disks. You can install the program on any drive and the process is automated, requiring very little input.

Configuring the program for network use, however, is a bit more problematic. ZyIndex installs easily on Novell Inc.'s NetWare or Banyan Vines, both of which use dedicated servers. But installing the program on a peer-to-peer network, where shared drives are usually designated differently on different systems, is more complicated.

Because ZyIndex's indexing system relies on absolute pointers to data, the user must jump through a few hoops — and in the right order — to get everything working properly. Specifically, you must use the DOS SUBSTITUTE command to assign the drive letter that client machines will use for access to the ZyIndex textbase data files. Then you must make sure you install the program at that designation and not to the local designation of the drive. It works best if you place all your data files in subdirectories of ZyIndex. Finally, you must designate the drive as a shared directory and connect it from the client using the SUBSTITUTE drive designation. After all that, you drag the ZyFind icon from the server's directory, and you should be in business. Designating a drive on a dedicated server is not a problem. **Score: Satisfactory.**

PERFORMANCE: TEXTBASE CREATION

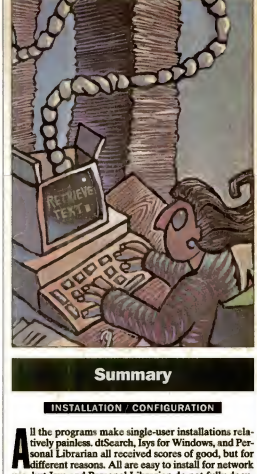
ZyIndex makes creating an index out of text files as easy as can be.

First, you indicate the files to index by listing them in the program's ZyBuild module — by file, directory, or subdirectory. Choose the Build/Now command, and ZyIndex is off and running.

The program recognizes all the major word processor formats, as well as dBase .DBF files and several of the major image formats (.TIF, .PCX, .BMP, and .EPS). You do not have to specify the formats of the files you are indexing because ZyIndex can usually determine them. ZyIndex recognizes all the important formats — and will even reproduce graphic images embedded in Word for Windows and WordPerfect for Windows documents — but it does not retain the documents' character and page formatting.

ZyIndex also provides several tools that you may want to use to build an index. You can add as many as 60 char-

See ZYINDEX, page 129



Summary

INSTALLATION / CONFIGURATION

All the programs make single-user installations relatively painless. dtSearch, Isys for Windows, and Personal Librarian all received scores of good, but for different reasons. All are easy to install for network use, but Isys and Personal Librarian do not fully document the proper procedure to do so. Isys stands out for its overall ease of installation, its high degree of control over program configuration, and its automated installation of Word for Windows macros. Personal Librarian does the best job of allowing a network administrator to optimize performance of client systems.

Getting ZyIndex for Windows to work on a peer-to-peer network is challenging, both because the process is complicated and because the program's documentation does not explain the procedure sufficiently. Sonar Professional received a score of poor due to its awkward install/uninstall protection scheme and the lack of information on network installation.

TEXTBASE CREATION

There is generally room for improvement in this category, even among the more capable products in this comparison. Even though this is a process you may perform only once, some of the developers obviously intended it to be a simpler exercise than others.

All of the products provided a "stop list" of common words that are not indexed and allow users to edit the list. However, none of the programs let us add or edit indexed files from within the application itself. Neither do any of the basic products support scanner input, although several offer add-on packages that provide that capability.

Your choice of indexer may also be narrowed by each product's handling of graphics files, which varied across the selection here.

Isys scored the highest (very good) for its textbase creation capabilities. It provides a flexible means of designating files to index, makes the process of updating in-

See SUMMARY, page 129

dtSearch (Continued)

alog box prompts you to choose among directories, specify file extensions to include or to exclude, and instruct the program to compress the index — a process that saves disk space and speeds searches. You can also check the Reindex Changed Files box to make dtSearch check all currently indexed files for any changes.

The program's indexing functions include an editable stop list that lets you specify which common words the program should skip when indexing.

dtSearch can automatically recognize most major DOS and Windows word processor formats, including both versions of Microsoft Word and WordPerfect, as well as Ami Pro and WordStar. The program does not index spreadsheet or database files.

The procedure of processing files into an index was simple to initiate and ran unattended. The only snag was that dtSearch wrongly identified 38 of our 1,260 test files as binary files (instead of ASCII) and refused to put them in the index. Later, we accidentally discovered that the program had recorded which files it could not digest in a file on disk, but there was no mention of its existence during the index operation.

Finally, although dtSearch's indexing tools are admittedly very limited, it is the only program in this comparison that lets you search unindexed files.

When we interrupted power during search operations, the system recovered without problems and maintained file integrity. **Score: Satisfactory.**

Isys (Continued)

Unfortunately, you cannot mark records as read-only. You can get around this and prevent network users from editing files (by launching them into parent applications) by using the network's tools to mark the directory containing the files as read-only.

Isys offers two flexible methods to attach images to records. You can attach an image to an entire file simply by putting it in the same directory and giving it the same file name, but with its own extension. When you call that file, Isys automatically detects the image file and adds a View Image button to the toolbar. Obviously, this works only with a single image file per text file.

Alternatively, you can attach images as annotations to any location within a text file. The program handles .BMP, .TIF, .GIF, .TGA, .EPS, .WMF, and .PCX (but not JPEG) file formats.

You can add text files to Isys databases in two ways. You can specify new directories — write new "rules," in Isys' lingo — to include in the indexer and perform an index update. Alternatively, you can simply add the text files to directories already in the index, then order an update.

Isys survived our power interruption without a whimper. The original index files were not corrupted, but we had to begin our updating procedure from scratch. **Score: Very Good.**

Personal Librarian (Continued)

5.x, Word for Windows 2.0, and ASCII. The program will not retain the character and page formatting of documents. Worse, Personal Librarian will not wrap text in ASCII files, which means you must save all ASCII text with carriage-return markers. One of Personal Librarian's most powerful features, data fields, can be used only in ASCII files. Personal Librarian requires that you establish all such links during the indexing procedure.

Personal Librarian is the only file indexer that lets you insert true searchable, sortable data fields. As with links, you must code fields into the text files before indexing. Unlike links, you must also define the fields in the Database Administrator module.

You can create up to 256 different data fields per record, but the program supports only alphanumeric field types. For example, there are no true date fields. Personal Librarian lacks a scanning interface, but the PLS Document Management System, a $4,975 (single-user) high-end configuration, includes Personal Librarian and a scanner input module.

Editing and updating records in Personal Librarian using outside programs is unusually cumbersome. You can't simply launch an editor or word processor; you must copy, edit, and replace that record in the Database Administrator module.

Personal Librarian was one of only two products, however (including Sonar), capable of fully performing our task of parsing a file into multiple records for indexing.

In short, Personal Librarian rates far above average in its power and flexibility, but it is clearly designed for professionals and not for the convenience of casual end-users who want to quickly assemble and index files. **Score: Satisfactory.**

PERFORMANCE: SEARCHING CAPABILITIES

The program's search language is generally intuitive. dt-Search performed our basic searches without a hitch, except for the phrase search. As with all the other products here, if you use dtSearch's stop list when indexing, the program will have trouble finding phrases. Unlike the other programs, however, dtSearch gives you the option of performing a phrase search — or any other of its searches — on specified directories without using the index. This is slow but lets you find exact phrases.

We found one quirk in dtSearch's use of the "not" argument. You must enter the word "and" before "not" when performing a standard "not" search. But you can enter "not" as the first term in an argument to retrieve all records not containing the specified terms.

Besides these basic search capabilities, dtSearch lets you search fields on the fly. To do so, you specify a character string that marks the beginning of the field, a string that marks the end, and the term to seek. Beyond that, dtSearch offers no exotic search tools, such as direction-al proximity, range, or quorum searching.

The program's search macros let you save search arguments for later use so you don't have to retype a long series of terms. Unfortunately, you cannot simply highlight an argument you have found effective and save it as a macro. Instead, you have to select Macro from the Options menu and enter the argument anew.

dtSearch maintains a catalog of the last 10 searches, even if they were performed during a previous session, so recalling a search is easy. Unfortunately, the program does not let you edit the search command that you summon. The only search argument that you can edit is the one you most recently entered at the command line. dt-Search was also unable to perform a search on the results of a previous search.

When you have completed a search. dtSearch returns a hit list and offers to sort by name, date, or number of hits. Once you choose, the program takes you to the actual list of files. You can modify the search results screen to display any of several fields of information: name, directory, modification date, modification time, title (first 24 characters of the file), and hit count.

Highlight the one you want and hit Enter, and the file pops up. You can go directly to the first hit in a file, but dtSearch does not highlight the hits themselves. You can also select the KWIC (key word in context) button to view each hit with a user-determined number of context lines around it. **Score: Satisfactory.**

See DTSEARCH, page 132

In Isys, you can build a search argument in two ways: by entering terms and selecting operators from a menu, or by entering all terms and operators at a command line. The menu, which is simple enough, lets you combine terms with eight operators.

If you enter arguments manually at the command line, you must remember the proper syntax and the exact spelling of operators, but you will have access to more flexible search tools. The command line also provides operators not available on the menu. Using the command line you can also vary proximity ranges.

Isys also lets you perform range searches for numbers and conduct a type of on-the-fly field searching.

Isys for Windows uses a stop list of common words that are not indexed, but Isys does not refuse to search for a phrase that contains stop words. Instead, Isys eliminates the stop words and automatically inserts a proximity argument to take up the slack.

Isys provides other useful search capabilities. For example, if you highlight a term or string of terms while viewing a file and click on the Query icon, Isys will automatically search for that term or terms. You can also maintain an editable synonym list for Isys' reference.

Those creating indexes for network use will be particularly interested in Isys' Query by Concept feature. Using Query by Concept, the index designer can generate a table of contents outline for indexed files that can lead users to files grouped by categories.

Isys lets you quickly save any search argument to a search catalog for future use. You can also recall the most recently performed search for editing, although the procedure is not intuitive. If you are using the search menu, you must hit Esc. Using the command line, hitting the Up arrow will do the trick.

Performing a progressive search on the results of the prior search is easy with Isys. Just choose Query Within Current Results from the Tools menu. Isys makes it easy to refine searches by clearly displaying the number of hits for each term entered, including variants. Isys returns a hit list of the file name and path and the number of hits in each file. You can view the list of retrieved files with the first line of text from each file or in a view that shows the bit surrounded by a user-definable number of lines. You can also link an image, create an annotation, or launch the file into a word processor.

Isys' obvious limitation is that you cannot sort retrieved records by user-defined fields. **Score: Very Good.**

See ISYS, page 132

Personal Librarian performed nearly all of our search tasks easily using easy-to-remember search language. The one exception was the phrase search, which Personal Librarian cannot do because it uses a stop list when creating the index.

We found one undocumented quirk: Personal Librarian's proximity operator works in only one direction. But the basics are only the beginning for Personal Librarian. The program also supports directional proximity searches and searches for adjacent terms. If you have created data fields, you can restrict searches to specified fields. Personal Librarian is one of the few programs that lets you conduct range searches.

But where Personal Librarian really stands out is with the tools it provides to edit and refine searches. Personal Librarian's most effective tool for this task is its relevancy ranking, which may preclude you from having to actually edit a search argument. The proximity search functions use an algorithm that processes how many times each term appears in a record. Then the program ranks each record for how closely it fits the argument.

When you must refine a search, Personal Library provides a host of tools. You can add search terms easily. Or, the program will generate a list of words that appear in the document in numbers similar to the search words' frequencies to help you find related records.

Personal Librarian also offers a pop-up hit list, its Search Detail window, that shows the number of hits for each term and how any operators affect those terms. You can do "Fuzzy" searches with help of a thesaurus.

With all these tools at hand, you will soon find yourself generating some rather complex search arguments. Fortunately, Personal Librarian lets you save those arguments in an Activities file for future use.

Finally, if you have included data fields in the textbase, you can create search "forms" to search only specified fields.

Personal Librarian by default retrieves records according to their relevance, with the most relevant record placed on top.

Personal Librarian is also unique in that it lets you sort records according to the contents of any predefined data field in either ascending or descending order. One obvious use of these sortable data fields would be to sort retrieved items according to date. **Score: Excellent.**

See PERSONAL LIBRARIAN, page 132

Sonar Professional (Continued)

the RDI files in directories you do not intend to update, but not until you have performed the SuperSetup.

If you do not have much hard disk space, you have to index in stages, eliminating RDI files as you go to make room. Given the occasional need to baby-sit the indexing process, it would be helpful if Sonar's indexing utility provided at least an indication of the time required to finish the task.

On the plus side, Sonar automatically recognizes the file formats it supports, which unfortunately are limited to the major Windows word processors. Sonar can display only Word for Windows files with embedded graphics and character formatting, although the only graphic file format it will display is the Windows Metafile (WMF). You can view WordPerfect for Windows files with character formatting intact, but not with graphics.

The program could not perform our test subtask of attaching or linking to a record a graphic file not already in an indexed document, although you can attach notes as large as 32KB to records.

Like the other programs in this comparison, Sonar does not let you edit or add to indexed files from within the program.

Sonar did, however, perform our test task of breaking up files into multiple records. Like Personal Librarian, Sonar lets you insert "block markers" into files before indexing to mark off searchable blocks, which are treated as unique records during searches. As a plus, Sonar lets you turn off the blocks in order to restrict the searches to files rather than to logical records.

Because of this block-marking feature, Sonar received a passing score in this category. **Score: Satisfactory.**

Zyindex (Continued)

acters of comments to each record. The program also provides an editable "noise word" list of terms that are not indexed.

ZyIndex does not allow parsing files, but you can enter "section headings" and "column markers" into files. Section headings are used to mark, either in the record's header or footer, what part of a file you are viewing. Before indexing, you enter a section heading argument that uses wild cards and variables that identify the sections of a file to the program.

Similarly, if your files contain inventory numbers, for example, you may want to use column markers during indexing to tell ZyBuild that columns 3 through 15 represent a single column of data. Then, you can subsequently search just within that column. ZyIndex lets you link outside graphic files to text files, or text files to other text files.

ZyIndex for Windows could not perform two of our tasks in this category: scanning text directly into a new record and editing records. If you want to scan into ZyIndex, you will have to purchase ZyImage — an $895 version of ZyIndex that interfaces with Calera Recognition Systems Inc.'s WordScan.

ZyIndex will attach notes as large as 4KB each to any location in a file. If you need to edit the file itself, you have to call up the original in a word processor. Fortunately, ZyIndex makes updating the indexes even easier than building the original textbase.

ZyIndex passed part of our stability test. Index files were not corrupted when we interrupted power during an indexing routine, but the program aborted rather than interrupt the indexing, so we had to start over. **Score: Good.**

Summary (Continued)

dexes a painless one, and permits you to easily link notes and graphic images to files. Isys also can index the widest variety of file types and can attach a large selection of graphics file types.

ZyIndex provides similarly easy text creation operations, but its index was corrupted when we interrupted power during operations. However, ZyIndex readily identifies most file types automatically and supports many of them. It provides some handy extra tools, such as its capability to attach comment fields to each record. Another strong point is the way you can tag files to index — by file, directory, or subdirectory, which demonstrates a versatility not found in the other products.

dtSearch makes basic indexing operations extremely easy but lacks the high-end tools necessary to structure textbases. It cannot link graphics, and it inexplicably failed to include 38 of our text files in the index.

Personal Librarian offers powerful structuring tools, but it had several annoying impediments to simple indexing. For example, it requires that you individually mark each file to be indexed, provides an awkward procedure for performing updates, and could not handle our full set of files at once, all of which held down its score.

Sonar's indexes require an inordinate amount of hard disk space. Also, if you use its SuperSetup indexes, which is the only way to have acceptable search speeds, changing even a single file requires reindexing the entire index. However, only Personal Librarian and Sonar appeared capable of fully performing our task of parsing a file into multiple records for indexing.

PERFORMANCE: SEARCHING CAPABILITIES

Most users will see immediately that Sonar marches to a different drummer when it comes to accessing data. It offers unique power, but it is decidedly more awkward to use than most other indexers.

For example, Sonar does not follow the usual model of launching a search by hitting the Enter key. Instead, you have to use the mouse. Sonar's search syntax is also unusual. Its arguments require the "&" symbol, for instance. Sonar performed our basic set of test searches, with the expected exception of the exact phrase search. As a default, Sonar uses an editable stop list.

If the command line search syntax is too taxing for you, you can turn to Sonar's handy menu, which leads you through selecting search operators. A third way to enter search arguments is by highlighting a phrase or individual words in the displayed record.

Sonar also offers an array of search tools that goes well beyond the basics. Besides giving users the option of putting directional restrictions on proximity searches, Sonar will search for the phonetic equivalents of terms and automatically extend searches to include synonyms.

Another unusual feature is Sonar's capability to produce a list of "associated" words that appear physically close to a search term. The list can be viewed alphabetically or in order of the frequency of appearance, and you can select from the list to perform further searches. The program also has a "relational" search feature.

Sonar does not offer data fields, but you can approximate their effect by inserting block markers in files and restricting searches to the blocks.

The program made simple work of subtask two — recalling the previous search and editing it. And if you want to keep a search active while branching off to perform a different search, Sonar is the only program that will do the trick. The program could not perform our third subtask, that of progressively narrowing down a search.

Sonar is also unusual in the methods it provides to navigate search results. Like Personal Librarian, Sonar immediately brings the first record retrieved to the screen, instead of providing a hit of choices. You can move to successive or previous hits or documents.

Sonar lets you move to other files through a hit list only through its Go To Document command, which then lists files and the number of hits. Or, you can select Instant Index from the Show menu, and you will see a list of files and the number of hits in each. **Score: Good.**

See SONAR PROFESSIONAL, page 133

PERFORMANCE: SEARCHING CAPABILITIES

ZyIndex passed most of our searching tests with flying colors. We could perform each of our test searches using the program's Search Request box and its easy-to-remember search language. As with most of the others, ZyIndex tripped on the phrase search.

However, ZyIndex's search tools go far beyond those used in our tasks. In addition to the plain vanilla proximity search, ZyIndex lets you specify which term must come first. The program can do fancy tricks such as range and quorum searches.

Finally, one of ZyIndex's most powerful capabilities is its field searching. You can define fields on the fly simply by telling the program what it should consider a field.

If you are not getting quite the results you expected, ZyIndex makes it simple to back to the most recent search argument and edit it. If you want to save any of those arguments for use in a future session, you can enter it as a Concept. ZyIndex performed without difficulty on our progressive search task.

With its clearly laid-out buttons to access previous searches, fields, and concepts, ZyIndex's Search Request screen is an exemplar of efficiency. You will also find buttons that pop up a thesaurus for search terms and online help to construct search arguments. Vocabulary shows a list of the entire contents of the index along with the number of times each word appears.

The program offers flexibility for getting the actual data once you have retrieved a set of files. You can set the Search Results display in either of two modes: a simple listing of retrieved files that shows the number of hits in each (along with the file's path and comments, if you choose), or a "KWIC" (key word in context) view that displays each hit in the context of its surrounding text.

The Search Results screen also offers a row of buttons that will return you to the search screen, show the highlighted file, print files, or launch them into their parent application. Once you call up a file, the button bar changes to include icons for moving to the next or previous hit or file.

In short, ZyIndex is extremely well designed for easy access to the data in the textbase, thanks to a combination of extremely strong search tools and easy-to-follow navigation aids.

The one significant knock on ZyIndex is that it does not provide automatic or manual sorting tools to manage retrieved files. It passed our crash test; no files were corrupted when we interrupted power during a search. **Score: Very Good.**

See ZYINDEX, page 133

SEARCHING CAPABILITIES

Personal Librarian earned top honors in this category, thanks primarily to its relevancy ranking, its wealth of search tools, and its sortable data fields.

Isys and ZyIndex are both very good. Isys is in most respects a tad stronger than ZyIndex because it provides a broad set of search tools rounded out with a capability to sort retrieved records by the number of hits in each, as well as a nifty menu to build search arguments. ZyIndex has a capable set of search tools, easy access to a variety of search aids, and strong tools to navigate retrieved files.

Sonar sports search capabilities as powerful as any of the competition, but it scored lower because its tools are more difficult to use. The program's search syntax is unusual, and you can't perform progressive searches, but you can navigate through a hit list.

dtSearch does well performing basic searches, but it lacks the high-end tools of the other programs.

See SUMMARY, page 133

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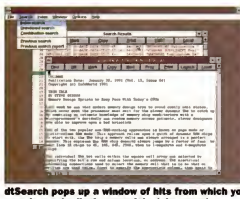
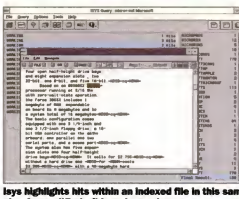
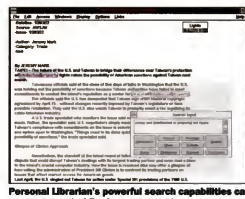


dtSearch pops up a window of hits from which you can choose to display an original document.



Isys highlights hits within an indexed file in this sample of a qualified wild-card search.



Personal Librarian's powerful search capabilities can answer a nested Boolean argument.

dtSearch (Continued)

Isys (Continued)

Personal Librarian

PERFORMANCE: DATA OUTPUT

dtSearch is weak at controlling data output. You cannot tag files for mass printing. If you select Print with the hit list displayed, however, the program will print the hit list. You can also print a particular file. In either case, the program offers the opportunity to adjust margins, page size, and page numbers, and to specify headers or footers.

The only subtask dtSearch could perform fully was the process of appending text to an existing file. You can also copy text to the Windows Clipboard to paste directly into another Windows application.
Score: Satisfactory.

Under Isys, you cannot tag a group of retrieved files and save them to disk. You must perform all such actions file by file, and Isys does not let you append to existing files when you save a record to disk.

You can print highlighted text or copy it into Windows' Clipboard or Notepad or Microsoft Mail.

Isys does not provide page and character formatting controls for printing; you must instead launch the file from Isys into your word processor.

You can distribute Isys' indexes over the network and to remote sites. Odyssey Development makes the process simpler by offering, at extra cost, an application called Isys Publisher. This program provides utilities to single out changed and new documents, and it compresses them into a single maintenance file you can use to update remote indexes. **Score: Good.**

Once you've retrieved a group of files, printing them either to disk or to paper is easy. Just select the Print command or check the Print-to-File box.

You can also choose whether to print records or the hit list of retrieved files. In either case, you can print specified ranges of records, although you cannot tag files for mass printing or saving.

If you're printing, the program lets you select from any of your Windows fonts and offers you the chance to change page margins and headers.

If you try to write records to an existing file, Personal Librarian warns that you are about to overwrite a file, but it does not offer the option to append to that file. You must use the Export command to append a record to an existing file. You can copy selected text from a record and paste it into the Windows Clipboard as usual.

Personal Library Software also sells a set of advanced authoring tools for users who create indexes for distribution or for others to use. **Score: Good.**

PERFORMANCE: NETWORKABILITY

dtSearch is network compatible, but the program does not offer any special features for network users. For example, you cannot assign passwords, limit users' access to specified features of the textbase, or make other restrictions common to multiuser applications. Nor does dtSearch let users access the index while it is being updated, but it passed our network crash test.

However, the program lets client systems search the index while it is in use on other machines.
Score: Satisfactory.

Isys provides strong controls for network use. You can use the Restrictions option in the Utilities module to grant or deny users access to functions. You can track all client usage of Isys. By filling in the Utilities module's simple dialog box, you can set the log to record activities.

You can set the program to let client systems query the server while the index is being updated, although the default settings prevent such access. Isys retained data integrity through our crash test. **Score: Excellent.**

Personal Librarian lets multiple users concurrently access records, even while the index is being updated on the server.

Personal Librarian does not provide special network tools to specify user access to the program's features. However, you can install only the Search module rather than the whole program on client systems, which saves disk space and prevents users from modifying indexes. Personal Librarian passed our crash test without a hitch.
Score: Good.

PERFORMANCE: SPEED

dtSearch is not a particularly fast performer. It required nearly 5 hours to index our 55MB of text, at least double the time of every other program except Personal Librarian, which took even longer.

dtSearch's search and retrieval times are also slow; the program ran a close race for last place with Sonar on most of our tests. **Score: Satisfactory.**

Isys turned in the fastest overall times. On most of the search and retrieval tests, Isys performed within fractions of a second of the times turned in by the other fastest retrievers — ZyIndex and Personal Librarian. But Isys also turned in virtually identical retrieval times when tested across our peer-to-peer network; ZyIndex's times dropped off noticeably.

Nobody comes close to matching Isys' sprightly indexing pace. The program digested our 55MB in only 55 minutes and 42 seconds. **Score: Excellent.**

Personal Librarian consistently turned in some of the fastest search and retrieval speeds. And, like Isys, Personal Librarian's speeds do not falter significantly on a network.

The program's one notable speed problem is with indexing. Personal Librarian was dead last in the race to index our 55MB of text, posting a time of 6 hours and 12 minutes. **Score: Very Good.**

PERFORMANCE: ACCURACY

dtSearch appears to have missed a moderate number of the hits in its several searches, but we could not closely monitor its accuracy because the program failed to index 38 files.

Curiously, and to its credit, dtSearch found 13 documents containing our nested complex search terms (a search result we verified as accurate); the other programs found only a single document.
Score: Satisfactory.

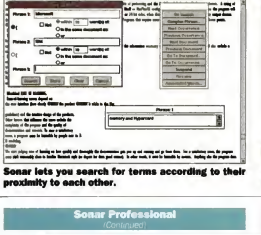
Isys retrieved the most records and recorded the highest number of hits in four of our eight searches, and it was very close to the highest retrieval rate in nearly all of the other searches. The program's accuracy is at least as good as that of any program in this comparison.
Score: Very Good.

Personal Librarian was very accurate in its searching, retrieving more legitimate hits than the other programs in several of our searches. It did relatively poorly, as did three of the other four programs, only in the nested complex search. **Score: Very Good.**

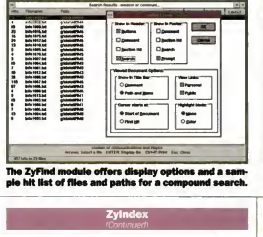
See DTSEARCH, page 136

See ISYS, page 136

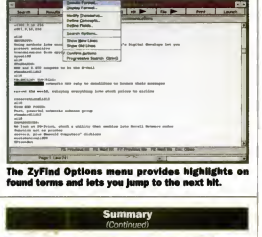
See PERSONAL LIBRARIAN, page 136



Sonar lets you search for terms according to their proximity to each other.



The ZyFind module offers display options and a sample hit list of files and paths for a compound search.



The ZyFind Options menu provides highlights on found terms and lets you jump to the next hit.

Sonar Professional (Continued)

PERFORMANCE: DATA OUTPUT

Sonar offers strong features when it comes to moving data from the textbase to the printer or to other applications. The only test task the program failed was tagging retrieved files and saving them to an external file.

The program will output a displayed file either to the printer or to disk, and you can append records that you are copying to existing files. Sonar is one of the few programs that lets you append selections to the clipboard without wiping out its current contents, which is a handy way to gather data. You can even set Sonar's clipboard to filter out unwanted characters, such as line feeds.

The program also lets you print a variety of special reports. For example, topic reports will print any comments you have attached to a record, along with the page of text to which it is attached. A search report generates a list of each hit within your defined context.

Sonar's fine management of data output does not extend to control over page and character formatting, however. **Score: Very Good.**

PERFORMANCE: NETWORKABILITY

We were unable to get Sonar to access our entire index across the network without receiving error messages, but we were able to access selected directories. This confirmed that the program will let multiple users access the same records simultaneously and also access the data while the index is being updated.

Sonar does not support passwords and other specialized network features, such as audit logs. **Score: Poor.**

PERFORMANCE: SPEED

You could grow old waiting for Sonar to load its index before you can perform the first search. (Loading the index takes more than half a minute.) And you may die before it finishes performing its first search of a session. One complex search that took 14 seconds to perform in the middle of a session required more than 1 minute and 14 seconds when it was the first search of the session. Apparently, the initial search of a session reads in index information that stays queued for subsequent searches.

Sonar's other search times varied as well. The same search took 3 seconds, 8 seconds, or 18 seconds depending on when in a session it took place. Sonar's only consistency is that it is significantly slower than the other programs in almost all search operations. **Score: Poor.**

PERFORMANCE: ACCURACY

Sonar's accuracy was generally fine, although a few searches seemed to stump the program. It missed at least 50 files that contained the word "pen" (our single-word search), and failed to retrieve many files containing "Unix" and "optic" (our compound search). We attribute the oversights to Sonar's method of handling hyphenated words; for example, the program apparently did not recognize "pen-based" as containing the word "pen." **Score: Satisfactory.**

See SONAR PROFESSIONAL, page 137

ZyIndex (Continued)

PERFORMANCE: DATA OUTPUT

ZyIndex lets you print retrieved files either to the printer or to disk, although it does not let you tag a group of files for mass printing. Instead, you must call up each file you want to print. Nor does the program allow you to adjust margins or perform other page or character formatting.

If you try to save a record to an existing file, the program offers the choice of appending the text or overwriting the file. Moving text from ZyIndex to another application using the Windows Clipboard is equally simple.

ZyIndex also lets you print a copy of a hit list and even offers you the chance to choose a different font, as well as to specify whether or not headers and footers should be printed. **Score: Good.**

PERFORMANCE: NETWORKABILITY

ZyIndex does not let the server installation of the program directly assign passwords or varying levels of access to the program from client machines. ZyIndex lets you create a search log to record information about accesses but will not record accesses by network users with read-only privileges. Concurrent access to records and textbases is no problem, even when the indexes are being updated by the server. However, ZyIndex had problems with our crash test; index files proved corrupted when we tried to update the index. **Score: Satisfactory.**

PERFORMANCE: SPEED

ZyIndex consistently turned in fast search and retrieval times. The only time ZyIndex fell behind was when searches took place across the network, roughly doubling the program time. Even then, however, the speeds were more than adequate.

ZyIndex was also the second-fastest to index our 55MB of text files, turning in a time of 2 minutes and 24 seconds. **Score: Very Good.**

PERFORMANCE: ACCURACY

ZyIndex snagged most of the hits in each of our searches, achieving a maximum accuracy rate in three of our eight tests and almost reaching the highest rates in all the rest of our searches. **Score: Good.**

See ZYINDEX, page 137

Summary (Continued)

DATA OUTPUT

Alas, none of these programs lets you tag files for mass printing or saving, a feature that many users would no doubt find welcome. Apart from that, there is a great deal of variation in the programs' output capabilities.

Thanks to its sophisticated clipboard and report-generating utilities, Sonar earned the highest score (very good).

Isys, Personal Librarian, and ZyIndex scored one notch lower. Each program provides good cut-and-paste capabilities and adequate control over printing files.

dtSearch scored lowest because its data output capabilities were minimal, relying on cut-and-paste operations.

NETWORKABILITY

Isys dominates the field in this category, thanks to its strong set of network features, including an audit log and restricted access to program features.

Personal Librarian is a steady network performer and allows concurrent access during indexing. dtSearch allows concurrent access to records, but not during reindexing. The program does not provide any special network tools to enhance its multiuser capabilities. ZyIndex provides fine concurrent access to its index.

Sonar had serious problems with this task category.

SPEED

There is a clear split between the fast search and retrieval programs and the slower ones. Isys, Personal Librarian, and ZyIndex turned in times within fractions of a second of each other on each of our searches.

Personal Librarian and ZyIndex rate very good, a notch behind Isys. Personal Librarian is equally fast across the network but lost some ground on its slow indexing speeds. ZyIndex is a fast indexer but was slower on a network.

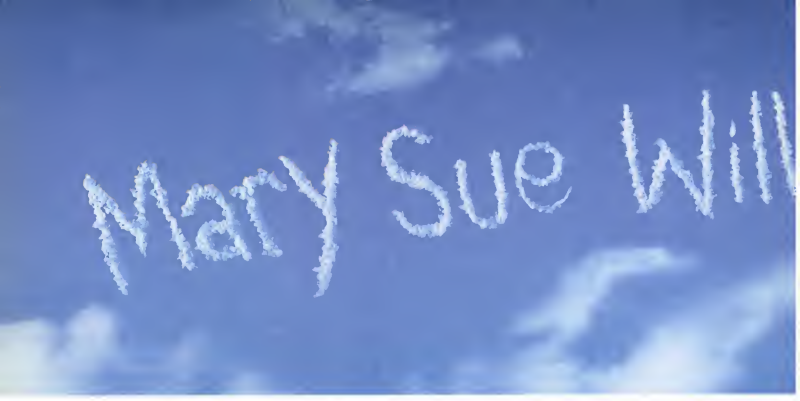
dtSearch and Sonar both turned in search and retrieval times well behind the others. Sonar's painfully slow loading and search times — especially on the first search of a session — prevented it from scoring higher than poor.

ACCURACY

There's not a lot of distance between the top and the bottom performers in this category. All of the programs did surprisingly well retrieving files that matched our search criteria in most of the queries.

Isys and Personal Librarian, however, found the top number of matches in four of our eight queries and were close to the top in the rest. ZyIndex was right behind the top two. dtSearch and Sonar brought up the rear with variable search results. Each program achieved the maximum number of retrievals in only a single query.

See SUMMARY, page 137



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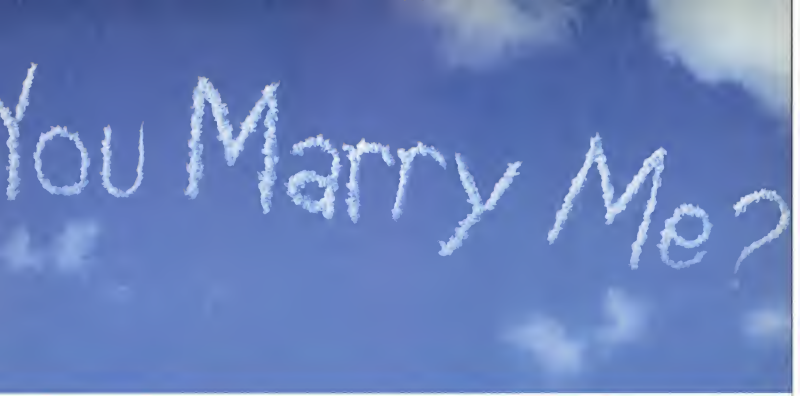
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dtSearch (Continued)

PERFORMANCE: CAPACITY

Although adequate for the needs of most users, dtSearch's capacity is small when compared with other programs. A single index accommodates 15,000 files, and a single file is constrained to only 64,000 characters.

dtSearch can accommodate multiple indexes in each search, and you can group indexes in sets of 25 (useful for grouping by topics, for example).

dtSearch does a creditable job of compressing its indexes. Its index of our 55MB of test text came to only 26.8MB. **Score: Satisfactory.**

DOCUMENTATION

The program's documentation is minimal. dtSearch's basic features are explained in clear, concise language, but the manuals offer no illustrations. Certain topics — such as the listing of previous searches — are not in the manual at all. Others, such as index libraries, are not listed in the index. In addition, the manual does not provide numbers for tech support. You will have to look in the on-line help menu.

dtSearch provides searchable, context-sensitive on-line help that is as thorough as the manual. **Score: Satisfactory.**

SUPPORT POLICIES

dtSearch offers a 60-day money-back guarantee. Technical support is available weekdays from 9 a.m. to 5 p.m. Central time. Fax-back support is available, as are a private BBS and CompuServe number. **Score: Very Good.**

TECHNICAL SUPPORT

We never had any difficulty reaching technical support, and we found the staff friendly and willing to help. **Score: Satisfactory.**

VALUE

With a list price of only $99, dtSearch is by far the least expensive of the programs reviewed here. It is also the least powerful in search tools, output controls, and network features.

But dtSearch has all the basic tools many users will need. The program does a surprisingly fine job of searching and retrieval, and creating indexes is an easy task. What's more, the program's capability to perform unindexed searches gives it a flexibility many users will find attractive.

In short, dtSearch could arguably command a significantly higher price. **Score: Very Good.**

DT Software Inc. of Arlington, Va. can be contacted at (703) 521-9427 or (800) 788-0787; fax: (314) 966-1833 and (703) 521-6140.

Isys (Continued)

Most users will not find Isys' capacity confining. The program can accommodate 2 billion words and more than 65,000 characters in a single document. One index can contain as many as 1 million files and 2 billion words.

You can search multiple indexes with Isys only if you have manually "chained" the databases in the Isys .CFG file. Isys does a good job of saving disk space, and it compressed the index for our 55MB of text files to only 19.3MB. Only ZyIndex produced a smaller index. **Score: Very Good.**

DOCUMENTATION

Isys' users' manual is well written, easy to read, and liberally illustrated. The manual also has a thorough index that makes finding topics a simple task. It includes a useful chapter on troubleshooting.

The manual was not sufficiently clear on some topics, most notably on network requirements. The program's searchable, context-sensitive, on-line help is well above average. The explanations are well written and provide hypertext links to other related topics.

Isys' plastic Quick Reference card explains screen elements that are simple to understand anyway, especially with the program's excellent on-screen cues in the status line. A primer on search syntax would have been more helpful. **Score: Very Good.**

SUPPORT POLICIES

Odyssey Development offers a 60-day money-back guarantee. In addition, the company provides a toll-free number for unlimited free technical support weekdays from 8:30 a.m. to 5:30 p.m. Mountain time. It also maintains a fax line and answers E-mail to its CompuServe account. **Score: Excellent.**

TECHNICAL SUPPORT

Odyssey Development's technical support staff was easy to reach and knew its program well. We received answers to all our questions, and in one case the technician was able to suggest a work-around to a problem we were having printing files that lacked a .TXT extension. **Score: Very Good.**

VALUE

At $395 for a single-user version, Isys is priced identical to its closest competitor, ZyIndex. Yet Isys offers some very interesting ease-of-use features, relevancy ranking, and links to the Notepad and Microsoft Mail. For most users, choosing between Isys and ZyIndex will likely be a matter of opting for one of the extra features Isys offers; or, on the other hand, choosing ZyIndex because of one of its special search tools.

Isys has another edge — network pricing. Odyssey offers a three-user concurrent license for $795, $200 less than ZyLab's multiuser price. Isys is also easier to set up on a peer-to-peer network and offers special network features, such as audit logs. **Score: Very Good.**

Odyssey Development Inc. of Denver can be contacted at (800) 992-4797 or (303) 394-0091; fax: (303) 394-0096.

Personal Librarian (Continued)

Personal Librarian's indexes have no practical limit. Although the program has a theoretical limit of 16 million records per index, you can maintain multiple indexes and open any number of them for simultaneous searching. It imposes no file size limitation, and files can contain multiple records through parsing.

Personal Librarian does not compress its indexes, which are often larger than the text. For example, the 55MB of text we indexed resulted in a 62.4MB index. **Score: Very Good.**

DOCUMENTATION

Personal Librarian's documentation leaves much to be desired. The manual's explanations are adequate but contain at least one outright misleading item: It says you can only do links with ASCII files. It is also too sparsely illustrated. The indexes are a bit skimpy, and some users will be irritated by the way the way the manual is split into two parts — one for the Search module and one for the Database Administrator module — each with an index.

Certain topics, particularly in the Database Administrator module, are not sufficiently explained. This is especially true of the sections that discuss changing the program's configuration files, a process that you must do manually.

On the plus side, the program provides two sample databases for new users to begin exploring the program.

The program includes a bare-bones on-line help facility. The help is neither context-sensitive nor searchable. The program somewhat makes up for its skimpy on-line help by providing the users' manual as a textbase that you can load and search. **Score: Poor.**

SUPPORT POLICIES

Personal Librarian Software provides free technical support to new users but requires that you purchase a service contract for long-term support. The lines are open weekdays from 8:30 a.m. to 6 p.m. Eastern time. The company responds to fax inquiries and E-mail sent over the Internet (support@pls.com). **Score: Satisfactory.**

TECHNICAL SUPPORT

We were able to reach technical support with no significant delays. The staff was friendly, clearly knowledgeable, and was able to answer all our questions quickly and concisely. **Score: Satisfactory.**

VALUE

Personal Librarian is in a class by itself, both in terms of its feature set and its price. At $995 for a single-user version, the program is the highest-priced application in this comparison; the nearest competitor (Sonar) costs $200 less. In terms of its searching power, Personal Librarian delivers on the implicit promise of its high price tag. But for such a premium price, you should get easier database maintenance.

Nevertheless, if you need the power features found in Personal Librarian, the program's price is not out of line because no cheaper program provides all its functionality. **Score: Good.**

Personal Library Software Inc. of Rockville, Md., can be reached at (301) 990-1155; fax: (301) 963-9738.

Sonar Professional (Continued)

PERFORMANCE: CAPACITY

Sonar can handle large textbases, although its maximum file size is constrained by the amount of RAM you have: If you have 8MB of RAM on board, for example, you can have documents as large as 6MB. Sonar can accommodate up to 4.3 trillion files.

By the same token, Sonar needs a lot of space to operate. Although index size varies depending on the types of files indexed, we found the indexes to be generally more than 100 percent the size of the files indexed. Indexing our 55MB of text files resulted in SuperSetup index files of 69.2MB. **Score: Satisfactory.**

DOCUMENTATION

Documentation is one of Sonar's weak points. The users' manual adequately covers the program's features, except for network-related issues. Unfortunately, the explanations are rather dense and often difficult to follow. In part this is because of Virginia System's propensity for using different terminology than most other indexers.

The manual also fails to provide information some users may find useful, such as the program's capacity limitations.

Sonar provides useful on-line help, but the program is complex enough and difficult enough to learn that it sorely needs a tutorial. **Score: Satisfactory.**

SUPPORT POLICIES

Virginia Systems provides unlimited free telephone support, but on your dime (unless they call you back), from 9 a.m. to 5 p.m. Eastern time, weekdays. You can also contact the vendor through AppleLink E-mail or send a fax inquiry. **Score: Satisfactory.**

TECHNICAL SUPPORT

Reaching technical support at Virginia Systems was a hit-or-miss proposition. On our first call, the technician said he would have to get back to us with an answer to our question, but it took two days. On our second call, no staff was available, but we got a call back within an hour.

When we did reach the support staff, we found them friendly, although not always able to answer our questions. **Score: Poor.**

VALUE

Sonar Professional competes with Personal Librarian. Both share the rare capabilities to rank records by relevancy and to parse files into smaller records for searches. Both offer strong sets of advanced search tools. Both are also a bit difficult to learn when compared with ZyIndex and Isys. Both are relatively high priced, with Sonar listing for $795, $200 less than Personal Librarian.

Nevertheless, Sonar cannot quite match Personal Librarian's feature set, and it is more difficult to use and manage. Sonar's indexing procedures alone impose a daunting cost on the program's overall ease of use.

One factor, however, may increase Sonar Professional's value to some users: Virginia Systems also provides a stripped-down version of the program for $295. Lacking many of Sonar Professional's advanced searching capabilities, the Standard version is an inexpensive way to distribute textbases to others. **Score: Satisfactory.**

Virginia Systems Software Services Inc. of Midlothian, Va., can be reached at (804) 739-3200; fax: (804) 739-8376.

ZyIndex (Continued)

PERFORMANCE: CAPACITY

ZyIndex is nothing if not generous in its capacity. A single index can contain as much as 20 gigabytes of data. If, for some reason, you wish to maintain multiple indexes, ZyIndex can search across multiple indexes in a single pass. A single index can contain as many as 50 million files, with a maximize file size of 4 gigabytes.

ZyIndex also does a good job of compressing its index. The index created for our 55MB of test files was only 17.5MB in size. **Score: Excellent.**

DOCUMENTATION

ZyIndex's manual is generally well written. It thoroughly covers the program's features and is adequately illustrated. The index has problems, though; many topics do not appear on the pages indicated.

Almost as unhelpful, the index is not discriminating. For many entries it apparently lists every page where the term appears instead of directing you to pages with major information on the topic.

The manual provides a helpful appendix explaining error messages, although we found it to be somewhat incomplete. When we encountered errors trying to link a graphic to a file, for example, the error message's explanation did not indicate the source of the problem to us. Other issues are also inadequately explained, such as the proper procedure for using the program with peer-to-peer networks.

On the positive side, the program's context-sensitive on-line help is thorough and written in easy-to-understand terms. And the program is positively riddled with helpful aids and cues where you most need them. **Score: Good.**

SUPPORT POLICIES

The company offers a 60-day money-back guarantee. ZyLab provides unlimited free support on a toll line, open weekdays from 7:30 a.m. to 6 p.m. Central time. The company also supports fax-back inquiries and has a private BBS. **Score: Very Good.**

TECHNICAL SUPPORT

Technical support frequently was unavailable when we called, but in each instance our calls were returned promptly. We found the staff very willing to help and able to answer most of our questions without delay. The technicians were, however, surprisingly ill-informed about peer-to-peer network issues. It took several days to get answers to our questions on this topic. **Score: Satisfactory.**

VALUE

At $395, ZyIndex represents a strong value. If you select another program, it will almost certainly be because of a special feature you need.

ZyIndex is roughly comparable in ease of use and power features to Isys, which carries the same price. However, ZyIndex's three-user concurrent license is priced at $995, $200 above that of Isys. **Score: Good.**

ZyLab of Buffalo Grove, Ill., can be reached at (708) 459-8000 or (800) 544-6339; fax: (708) 459-8054.

Summary (Continued)

CAPACITY

ZyIndex wins top laurels in this category thanks to its ample maximum index size, capability to search multiple indexes at a time, and capability to compress its own index files more than any of the other applications.

Isys and Personal Librarian scored one notch below. Isys has a large capacity per textbase but lets users search only one index at a time; so does Personal Librarian, which also does not compress its index.

Sonar and dtSearch have satisfactory capacity. Sonar's indexes require so much room that your capability to create textbases may be compromised.

DOCUMENTATION

None of the programs reviewed here is accompanied by knock-your-socks-off documentation. Isys ourdistances the others with its polished, readable manual and solid on-line help. But Isys' manual doesn't cover all topics completely, especially for the steps required to set up the program for network use (a failing shared by all the other programs in this comparison).

ZyIndex has very readable documentation but was held back by its poorly focused — and often incorrect — index and incomplete listing of error messages.

dtSearch and Sonar's terse manuals need attention. Personal Librarian's documentation needs to be fact checked; we found errors.

SUPPORT POLICIES

The developers of dtSearch, ZyIndex, and Isys provide a range of ways to reach them, including telephone, fax, and on-line support. Odyssey was the only vendor to offer toll-free phone support. Personal Library was the only vendor that did not offer unlimited free support (it limits free support for an unspecified time of installation and ramp-up).

TECHNICAL SUPPORT

All the vendors but Virginia Systems gave us support that was satisfactory at the least. ZyLab's personnel often were not in the office, but our calls were returned promptly. The staff was also generally knowledgeable about the product, with the exception of network issues.

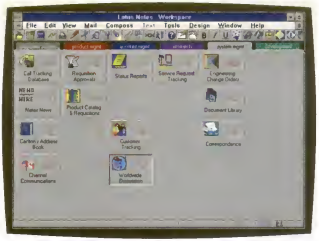
Sonar earned a score of poor because of the staff's failure to return calls and its inability to answer our questions.

VALUE

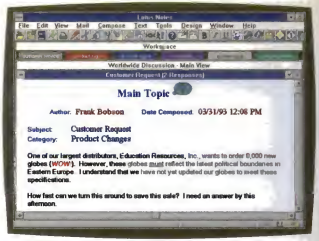
dtSearch and Isys in particular are especially good values when compared with the competition. dtSearch has the weakest feature set, but its $99 price makes it a bargain. Isys — at $395 — also offers special value, particularly when you consider the program's relevance ranking and its control over network access.

Personal Librarian and ZyIndex are priced reasonably. Personal Librarian is expensive, but it has the brute power to justify its cost. ZyIndex is a solid, easy-to-use performer.

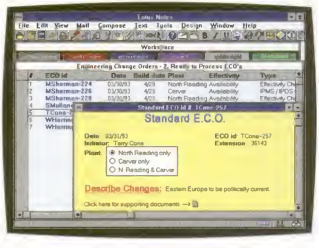
Sonar pushes its price point a bit hard. The program is powerful but difficult to use. You can gain nearly the same power by spending much less on ZyIndex or Isys, and you can gain more power and greater ease of use by spending a bit more for Personal Librarian.



1. This is James' Notes desktop. He uses it to access information and work quickly with people in all departments to solve problems world-wide. James clicks on the Worldwide Discussion application to catch up with important company news. The SmartIcons across the top make it even easier to work in Notes.



2. The field rep in Texas is working on a request from a customer. But to make the sale, the product, in this case a globe, has to be changed to reflect the most up-to-date countries and borders. And evidently time is critical. The competition must already be in there pitching.



5. Once he has the information, he clicks on the Engineering Change Order application to request specific product changes from the plant in North Reading. He links the supporting Newswire information to the E.C.O. It will be easily viewed with a single click of a button.

6. After lunch he opens a document from Ellen, in product development, who has responded with the necessary changes, and scheduling information. The new art was scanned directly through Lotus Notes: Document Imaging from the art department. James approves the art for manufacturing.

How Lotus Notes Relea

Thousands of companies already know how Lotus Notes helps them respond more quickly and effectively to the demands of everyday business. Now Release 3 extends that power to new dimensions.

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variety of platforms. How he uses applications such as Account Tracking, Newswire, and Engineering Change Orders to get a new produc developed fast. And how he creates an informa team spanning a range of departments to do it.

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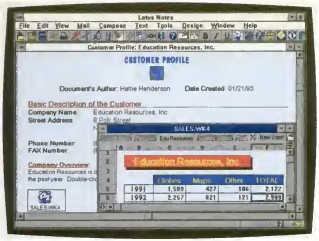
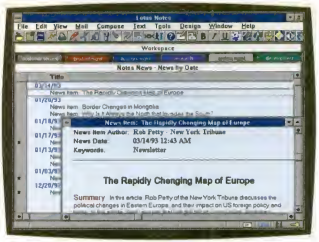
Which means the award-winning workgrou power of Lotus Notes® is now readily available t help virtually all networked businesses improv

*UNIX Server and Client available by year end 1993. In Canada, call **1-800-GO-LOTUS**. ©1993 Lotus Development

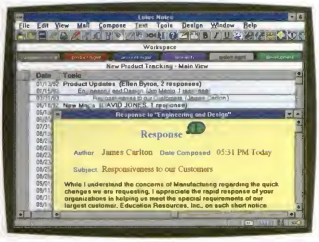
Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, Lotus Notes and 1-2-3 are



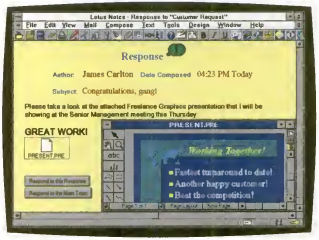
3. He clicks on the Customer Tracking application to learn more about this customer. The profile includes an attached 1-2-3® spreadsheet. He double clicks the icon to open the spreadsheet and finds that Education Resources is a very large customer that pays its bills.



4. James' next step is to click on the Newswire database for the most up-to-date report on precisely what geographical changes will have to be made on the new globe. And just how extensive they'll be.



7. On the Product Tracking application, all departments involved have confirmed that they can meet the schedule. However, they've cautioned James to be careful about rushing schedules in the future. James uses the Discussion database to acknowledge their comments and thank them for their efforts.



8. Wanting to record and promote the team's accomplishments, James puts together a presentation for senior management in Freelance Graphics. Then he posts the presentation in the Presentation database so everyone can see how the team rearranged the world to save a big account.

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HOW WE TEST / from page 124

Windows file indexers

Speed: For this task we performed and timed a series of increasingly complex searches on our database using each product. We searched for: a term that did not appear in the textbase (called "no match" in our benchmark chart); a term that appeared only once ("single match"); a term that appeared dozens of times ("several matches"); and a term that appeared more than 1,500 times ("many matches").

We also looked for a term that used the "*" wild card or equivalent symbol for the particular program.

We also did a compound search for records containing a rare word (Unix) and a common word (optic). We performed this search twice, once entering the rare word first and the second time entering the common word first. We searched using a nested Boolean argument ("term1 and [term2 or term3] not term4"). We also ran a proximity search to find files in which one term occurred within 10 words of a second term.

We also recorded each program's times for indexing our 55MB of text files.

We scored each program relative to the performance of the other programs in the comparison. The fastest program received a score of excellent.

Accuracy: While testing speed, we recorded the number of hits and files retrieved in each search. After confirming the legitimacy of all findings, we used the highest number of hits and files found as the baseline goal for our accuracy scores. The product with the overall highest number of hits or files (or both) received top score; we rated the other programs in relation to that best performance.

Capacity: In this category, we scored two features: how many files can be in one index and how many indexes the package can maintain.

A program that supported an unlimited or unusually high number of both, as well as created indexes of a reasonable size, received a score of excellent.

DOCUMENTATION:
Documentation scores reflect the quantity and quality of both written and on-line information.

For a satisfactory score, documentation should describe the product and how to use it and include a table of contents and an index. We awarded bonus points for a quick-start guide, on-line tutorial, and written tutorial. Poor organization, missing information, or an incomplete index lowered the score.

SUPPORT:
Support policies: Vendors who offer unlimited free support for their products received a score of satisfactory.

We awarded extra points for money-back guarantees, toll-free lines, support via fax or BBS, extended support hours, and custom corporate support plans. We subtracted points if the vendor provided limited support or none at all.

Technical support: We based scores for technical support on the availability of technicians and the quality of service we received during multiple anonymous calls to the vendor.

VALUE:
Value scores reflect the list price weighed against a product's task-oriented performance, taking into account the competing products in the category.

TEXT RETRIEVAL / from page 123

Windows file indexers

ly, each type of application appeals to different types of users, although there is undoubtedly some overlap.

Determining which type of text retrieval program is best for you can be tricky because it requires close examination of several key factors. You should consider the specific types of information you want to search, the specific types of searches you will perform, whether you need to edit records on the fly, whether you need to keep the information in separately existing DOS files (not to mention whether you have sufficient available disk space), and any need for network operations.

An academic researcher or attorney, for example, may need to index relatively large documents yet perform very focused searches on smaller bits of data within those documents. For such purposes, a textbase — which can break those files into smaller, searchable chunks of data — is generally a better solution than a file indexer.

File indexers, the subject of this comparison, are likely to be of greatest interest to general business users. If you have large amounts of text data and need to retrieve it primarily as entire files — such as correspondence, invoices, medical records, and the like — file indexers provide powerful search tools to directly find in seconds the file you want. Even within the category of file indexers, however, there is a great deal of diversity. Some programs maximize ease of use, others emphasize an arsenal of powerful and very specific search tools.

In this comparison we examined the new crop of Windows file indexers: DT Software Inc.'s dtSearch 2.0; Odyssey Development Inc.'s Isys for Windows 3.0; Personal Library Software Inc.'s Personal Librarian 3.0; Virginia Systems Software Services Inc.'s Sonar Professional 2.0; and ZyLab's ZyIndex for Windows 5.0.

In an upcoming comparison, we will examine the latest Windows textbases — including programs such as Folio Views for Windows, AskSam for Windows, and Lotus Notes 3.0. Early next year, we will take a close look at both document retrieval packages (which let you retrieve not only the text but the images of documents) and high-end, multiplatform network text retrieval programs.

Patrick Marshall is vice president of Pacific Analytica International, a Seattle-based consulting and publishing firm that specializes in technology and trade issues. He has 10 years of experience with a variety of software and hardware.

BENCHMARKS

INFO WORLD

Text retrieval: file indexers

	dtSearch Version 2.0	Isys for Windows Version 3.0	Personal Librarian Version 3.0	Sonar Professional Version 2.0	ZyIndex for Windows Version 5.0
Benchmarks in seconds[1]					
	Single user / Network	Single user / Network	Single user / Network	Single user only[2]	Single user / Network
No match	0.8 / 1.4	0.8 / 1.0	1.2 / 1.1	1.9	0.8 / 2.0
Single match	1.2 / 0.5	0.8 / 0.8	1.0 / 1.2	5.7	0.8 / 1.6
Several matches	3.5 / 3.6	1.2 / 0.8	1.0 / 1.0	8.4	0.8 / 2.4
Many matches	9.03 / 4.5	1.0 / 1.0	0.9 / 1.0	8.35	1.5 / 2.5
Simple wild card	4.8 / 4.3	1.1 / 1.2	0.9 / 0.9	3.2	1.1 / 2.3
Compound	15.8 / 19.2	0.9 / 1.0	1.2 / 1.3	14.19	1.2 / 2.7
Reversed compound	15.8 / 9.7	0.9 / 1.0	1.1 / 0.9	7.8	1.1 / 2.7
Complex	10.22 / 10.2	2.2 / 1.9	1.5 / 2.0	14.5	N/A
Proximity	17.4 / 20	2.0 / 2.1	0.9 / 3.8	11.56	1.1 / 3.2
Time to index 55MB	4:47:34	0:55:42	6:12:45	2:58:78	2:24:12
Size of index files (in MB)	26.8	19.3	62.4	69.2	17.5
Accuracy[3]					
Single match	Yes	Yes	Yes	Yes	Yes
Several matches	39 files	92 hits / 42 files	44 files	92 hits / 43 files	88 hits / 41 files
Many matches	288 files	1,544 hits / 294 files	305 files	1,007 hits / 243 files	1,535 hits / 289 files
Simple wild card	46 files	278 hits / 47 files	45 files	218 hits / 46 files	278 hits / 47 files
Compound	89 files	686 hits / 90 files	90 files	113 hits / 17 files	683 hits / 90 files
Reversed compound	89 files	686 hits / 90 files	90 files	113 hits / 17 files	683 hits / 90 files
Complex	13 files	1 file	2 files	1 file	0 files
Proximity	24 files	23 files	26 files	24 files	24 files

Test bed: 66-MHz 486 with 16MB of RAM and 640MB hard drive with an UltraStor caching controller.
We conducted peer-to-peer network tests on two 66-MHz 486 systems with 340MB hard drives.
[1]Times for indexing 55MB in hours:minutes:seconds.
[2]Sonar Professional is not networkable.
[3]We used as a baseline for accuracy the results from the product that produced the highest number of hits or files (or both) for a search. We compared all other products' results to these highest numbers. Where only the number of files are shown, the product is incapable of listing number of hits.

REVIEWS

Painter carves out image editing niche

No other Windows image editor offers comparable special effects or texture tools

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

The best just got better. If you were impressed with the effects you could create in Fractal Design Corp.'s Painter 1.2 for Windows, with its mimicking of oil brushes, pastels, pencil, pens, and half a dozen other natural-media tools, just wait until you see what Painter 2.0 can do.

New controls over lighting let you simulate turning spotlights on an image in various intensities and from various angles. Another important new tool is the "liquid effects" brushes, which can mimic the effect of drawing a palette knife through the oils on the canvas. In addition, Painter 2.0 introduces a text tool and an array of new image filters for even more control of your image.

At the same time, Fractal Design has made many of Painter's earlier tools easier to deal with, thanks in particular to the program's new previews, as well as its tear-off brushes and paper textures.

Finally, the program has been rounded out with a scanning interface and the capability to generate color separations.

The memory-handling problems we encountered with Version 1.2 have been rectified, and the program is noticeably quicker at performing many operations, although it can hardly be described as fast, even on our test machine, an EISA 66-MHz 486 equipped with 16MB of RAM, a 680MB SCSI hard drive, SuperMac's SuperMatch 24-bit video board, and a Wacom pressure tablet. But speed problems are understandable in light of the intensive data manipulations that Painter performs.

We used the scoring criteria from our August 10, 1992, product comparison of image editors (page 51).

PERFORMANCE:

Image editing tools: Painter has added some image editing tools and significantly improved its existing ones. As in Version 1.2, Painter can automatically apply "auto-clone" filters to an entire image to simulate special brush stroke effects, such as oil brush or pencil lines. You can also select the texture of the surface being painted and apply a tint to the image.

Painter 2.0 has added a range of filters and has made the filters easier to employ. Painter's new array of glass-distortion filters give the impression that you're looking at an object through various types of glass, including frosted glass and glass bricks.

Other new filters include equalization, posterize, sharpen, soften, motion blur, distort, marbling, and highpass (which enhances the difference in levels of brightness). And, as before, Painter supports the use of third-party filters, such as those provided with Aldus Corp.'s Gallery Effects.

There is, as yet, no utility for adjusting the image's overall hue or saturation, although you can apply a color overlay to the image, which will also include the selected paper texture, and you can adjust the amount of color through the Adjust Dye Concentration utility.

One very welcome addition is the set of preview boxes that lets you see the effect of filter adjustments on a small swatch of the image. Some adjustments, such as those of brightness, contrast, and equalization, actually adjust the entire image in real time. Both methods make it simple to adjust effects without continually bouncing between the utility and the image. You can even save particular treatments of the preview as brush looks and apply those looks to other images.

Painter's selection masks, or friskets, have also been improved. They now include a magic wand for making automatic selections of regions of an image and a rectangle tool that can be constrained to a square. Still missing are circle and ellipse tools.

You can resize and reshape masks using the frisket-editing tool, which places eight drag handles around the selection. With freehand friskets, there is more control: You can add to or subtract from a freehand frisket by holding down the Shift key while you redraw the line. Unfortunately, the same process won't work with rectangles.

We rate Painter's image editing tools good.

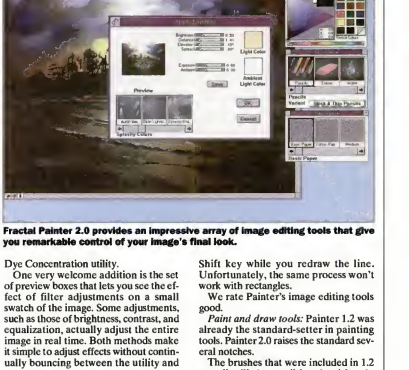
Paint and draw tools: Painter 1.2 was already the standard-setter in painting tools. Painter 2.0 raises the standard several notches.

The brushes that were included in 1.2 are all still there: oil brush, airbrush, crayons, chalk, pencils, watercolors, ink pen, felt pen, and charcoal. Each brush comes with several preconstructed variants, and Painter provides incredibly sensitive controls to fine-tune brush effects.

In addition to letting you adjust opacity and diffusion, Painter provides controls for feathering edges, adding "jitter" to the brush stroke, making the brush sensitive to the paper texture you have chosen, and selecting whether the paint will interact with underlying colors. These controls are the same as before, but the language and adjusters in the Brush Behavior dialog box have been simplified.

With Painter's fine implementation of support for pressure tablets, you can control not only the size and density of brush strokes but even the transition from one color to another. You can adjust brushes to achieve virtually any natural media effect, as well as some unnatural ones. And you can save any custom brush you create for future use. Painter supports Wacom, CalComp, and Kurta tablets.

The new brush and texture tools in Painter 2.0 add significant strength to the product. The Light Source utility makes it simple to enhance images with sophisticated lighting effects. The utility lets you specify multiple light sources, adjust the intensity and color of the light, and control the spread and elevation of the



Fractal Painter 2.0 provides an impressive array of image editing tools that give you remarkable control of your image's final look.

Painter provides sensitive controls to fine-tune brush effects. In addition to letting you adjust opacity and diffusion, Painter controls feathering edges, adding "jitter" to the brush.

REPORT CARD — INFO WORLD

IMAGE EDITING SOFTWARE

Fractal Design Painter for Windows

VERSION 2.0

Criteria	(Weighting)	Score
Performance		
Image editing tools	(200)	Good
Paint and draw tools	(100)	Excellent
Import and export	(100)	Good
Speed	(75)	Satisfactory
Documentation	(100)	Satisfactory
Ease of learning	(100)	Satisfactory
Ease of use	(125)	Good
Support		
Support policies	(50)	Good
Technical support	(50)	Very Good
Value	(100)	Very Good
Final score		**6.4**

PRODUCT SUMMARY

Company: Fractal Design Corp., in Aptos, Calif., can be reached at (408) 688-8800; fax: (408) 688-8836.
List price: $395.
Requirements: Intel 80386 or compatible; Super VGA (24-bit color recommended); 4MB of RAM; Windows 3.0 or later.
Pros: Excellent brush controls and texture effects, color separations.
Cons: Difficult to learn; no tutorial.
Summary: Painter's capability to mimic natural media is incredible. It's tough to learn, but this program's fine control over brush effects makes it possible to create virtually any effect you're after.

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light. As with many of the other texture controls, the lighting utility provides image previews and preset selections that make the process significantly easier. Like the paper texture feature, you can paint onto lighting effects so you can achieve interaction between the paint and the light.

The other major enhancement to Painter's selection of special brushes is the Liquid tool, which can simulate the effect of dragging a knife through wet oil paint or manipulating a pool of liquid. Depending on the setting you choose, you can use the tool to simulate marbling or watercolor diffusion.

Fractal Design has also added two new special artist effects. In addition to the Van Gogh and Seurat brushes of Version 1.2, there are now brushes that mimic cubist and impressionist styles, as well.

Color selection is simple using Painter's Hue Saturation Value (HSV) palette. In addition to selecting directly from the HSV triangle, you can save colors to the 15 swatches at the right of the triangle for easy access to your frequently used choices and for future selection. Version 2.0 also provides 14 predefined palettes, each containing 15 colors, and you can always create and save similar palettes.

Painter now makes creating a painting less complex by letting you tear off brushes and textures from tool palettes. You can then close the tool palette to unclutter your work space but still retain quick access to tools you use frequently.

Finally, Painter 2.0 offers a new text tool that allows you to import TrueType and Adobe Type 1 fonts as friskets.

We rate Painter's paint and draw tools excellent.

Import and export: Fractal Design has greatly improved Painter's capability to import and export images. Though there is no support yet for JPEG, Painter can import and export TIF, PCX, BMP, TGA, and PCT files. In addition, you can save files in encapsulated PostScript format.

Version 2.0 adds TWAIN support for scanners and other acquiring devices, which means that you won't have to resort to another image-editing program just to scan an image. Unfortunately, we could not get the drivers to work at first. The company sent us an amendment that is also available to customers.

Painter 2.0 introduces the capability to generate color separations. You cannot, however, edit the separations directly, as some other programs allow. Painter also lets you adjust for press gain and to set dot shape, screen frequency, and angles, though the program still lacks other high-end prepress controls, such as setting undercolor removal and total inking limits.

If Painter is a bit weak on print controls, it does offer unusual strength in controlling the display. To begin with, you can limit your display palette to only those colors that are printable. Similarly, you can adjust image colors into those that are compatible with American and European (NTSC and PAL) video systems. Specifically, bright yellows and cyans do not translate well, so Painter will automatically adjust those colors. We rate import and export good.

Speed: Speed remains one of Painter's few weak points. The program was very slow to load our 5MB TIFF file, and it took more than a minute and a half to perform a 20 percent change in brightness on the image, roughly seven times longer than Adobe Photoshop and three times longer than Aldus Photostyler and Micrografx Inc.'s Picture Publisher.

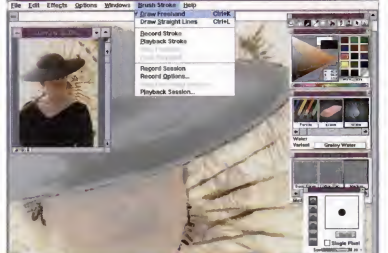
In fact, the only test Painter was able to perform faster than the other image editing packages was scrolling the test file, which it accomplished in less than 22 seconds. The fastest program, Photostyler, required more than 28 seconds. Many users will excuse the lethargy in view of the exquisite image control the program provides. We score Painter's speed satisfactory.

DOCUMENTATION:

Painter's documentation remains one of its most frustrating features. The users' manual is well illustrated with four-color samples, but the writing is often either overly descriptive or irritatingly chatty.

The on-line help is not context sensitive and often lacks listings it should have, such as "light source." Also, the explanations of features often amount to definitions of the terms rather than explanations of procedures. Look up "screen frequency," for example, and you'll get a definition of what screen frequency is, not an explanation of how to control it with Painter.

Being such a complex and powerful program, Painter is sorely in need of a tutorial. According to Fractal Design, a partial solution to that need — Painter Companion — should be available soon.



You can scan a photograph into Painter and then use the "tracing paper" feature to generate a guide for creating your own rendition of the image.

We rate Painter's documentation satisfactory.

EASE OF LEARNING:

Painter is still a difficult program to learn. The variety of brush and texture tools and the subtlety of controls simply cannot be learned quickly.

Fractal Design has made the program marginally easier to learn by simplifying the language and controls of certain critical dialog boxes and utilities, but not enough to change our score. We rate ease of learning satisfactory.

EASE OF USE:

There are a number of major obstacles to using Painter, some of which are unavoidable. The program's speed, for example, is excruciatingly slow on many operations. Sitting on one's thumbs while waiting for a brush stroke to be implemented can have a stifling effect on artistic inspiration.

Many of Painter's other ease-of-use problems could be resolved, however. The long pauses during operations would be less disruptive, for example, if Painter consistently displayed an hourglass or some other icon when it is busy to indicate that it's working. As it is, you'll often find yourself trying to invoke commands in vain, not aware that Painter is still performing an operation.

The addition of a tool scratch pad, more flexible masking tools, better controls for editing masks, and better procedures for moving tool windows would also help.

Some of Painter's tools involve unnecessarily contorted procedures. In order to use tracing paper, for example, you must first create a clone of the image, then hit the Backspace key, then select Trace from the Options menu. Why not build all those steps into the Trace command itself?

This said, Fractal Design has made certain improvements in Version 2.0 that raise the program's score in this category a notch. The tear-off brushes and textures, for example, make it possible to clean up the workspace while retaining quick access to tools. And the addition of previews to filters and other utilities make the program easier to use. Ease of use is good.

Some of Painter's tools involve unnecessarily contorted procedures. In order to use tracing paper, for example, you must first create a clone of the image, then hit the Backspace key, then select Trace from the Options menu.

SUPPORT:

Support policies: Unlimited, but not toll-free, telephone support is available from 8 a.m. to 5 p.m. Pacific time, Monday through Friday, and via fax, CompuServe, and America Online. Since we did our last review, Fractal Design has discontinued its money-back guarantee. If you purchase Painter from a dealer, the dealer may provide its own money-back guarantee. We rate support policies good.

Technical support: We never experienced any delays in reaching technical support, and the technicians knew the program inside and out. In one instance, a technician suggested a partial workaround to the program's lack of a utility for adjusting the hue and saturation of an image. We rate technical support very good.

VALUE:

How much would you pay for a glass of water? Not much? How much would you pay if you were dying of thirst in the desert?

The point is, there is no program that provides the kinds of brush effects that Painter offers. If you want or need those tools, you would be willing to pay much more than the $399 list price on the program.

With Version 2.0, Fractal Design has not only made Painter a stronger painting program, it has provided access to a scanning interface and the capability to generate color separations, both of which will save many users the cost of additional programs.

Painter 2.0 is a major upgrade that transforms this unique and impressive program into a tour de force. We rate value very good.

Patrick Marshall is vice president of Pacific Analytica International, an economic research firm based in Seattle.

BENCHMARKS — INFO WORLD

	Fractal Design Painter Version 2.0	Micrografx Picture Publisher for Windows Version 3.1	Adobe Photoshop Version 2.5
Open image*	0:38:40**	0:05:09	0:26:00
Apply 20% brightness filter	1:34:47	0:32:50	0:12:05
Save file in native format	0:40:50	0:16:10	0:15:04
Scroll from top to bottom	0:21:90	0:47:32	1:08:47
Zoom from 1:3 to 1:1	0:09:40	0:01:60	0:02:90
Open file in native format	0:35:90	0:05:04	0:20:07

*Test bed: ESA 66-MHz 486 equipped with 16MB of RAM, a 680MB SCSI hard drive, SuperMac's SuperMatch 24-bit video board, and a Wacom pressure tablet. We performed the tests on a 5MB .TIF image.
**Times in minutes:seconds:hundredths of seconds. Lower numbers indicate better performance.

LAN Escort 2.0 eases Windows administration

LANovation adds reporting and multiple server support to easy-to-use package

By Paul Ferrill Review Board

Anyone who has tried to administer a network with a large number of Windows users knows what a job it can be. LANovation Corp.'s LAN Escort 2.0 makes the tedious task of administering workstations on a NetWare LAN a simple point-and-click operation — you may never have to run Novell Inc.'s SYSCON again. LAN Escort automates the task by storing a set of defaults for all new users, including directory and file access rights, available applications, and printers.

LAN Escort also enables the network administrator to create any number of default desktops for different groups of users. For example, you can have the same desktop for everyone in accounting and a different desktop for the engineering group. It also means that you will have access to your own personal desktop no matter what workstation you use.

We based our review criteria on the test plan established for the January 20, 1992 (page 75) product comparison of network menuing and metering software; however, because LAN Escort does not currently offer software metering, the report card is slightly different.

We tested LAN Escort using a Novell NetWare 3.11 network with 286, 386, and 486 workstations.

FEATURES:

LAN Escort's main purpose is to ease Windows client administration. It has a Windows-based interface that includes program applets: Administration, Network Programs, Printers, and Homedirs. The Administration icon gives you access to all administration functions, including configuring LAN Escort, setting up users or groups, assigning file and directory access rights, and attaching network printers. A comprehensive help file makes the documentation almost unnecessary.

The Network Programs and Printers applets provide a way of assigning application programs and network printers to individual users. The Network Programs applet displays a window with a list of all programs assigned to a user. The Printers icon displays all local and network printers assigned to the user. The Homedirs applet is an easy way of setting up existing NetWare users to access Windows by copying the necessary files to their home directory.

LANovation's LAN Escort enables the network administrator to create any number of default desktops.

PERFORMANCE:

In analyzing LAN Escort's performance, we examined two areas: menuing capabilities and security. In the menuing section we discuss the user interface in general, access to other applications, and printing to network printers. Security covers both the user's personal security and server security.

Menuing capabilities: LAN Escort's administration program has a graphical interface with both icons and a drag-and-drop functionality, making administration a snap. A print option even allows you to get a printout of any screen in the program. However, you cannot export information to another program

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- 21 Transition Effects
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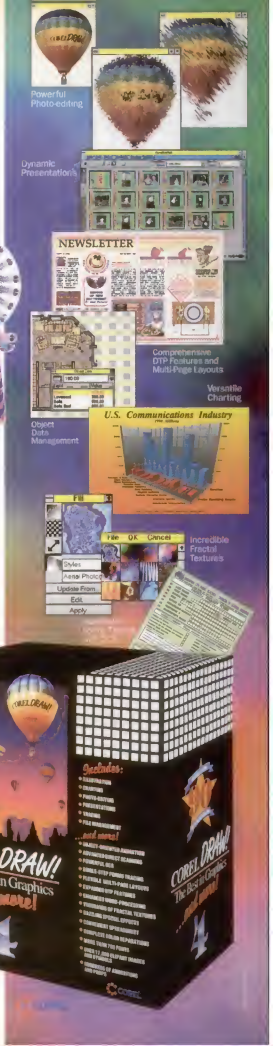

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(such as a word processor) to generate a report.

You can create and manage multiple Windows desktops and assign them to a group or single user. Once a default desktop is in place, users have easy access to application programs and network printers using the same drag-and-drop functionality. If you click on a program icon in the Programs window and drag it to either a specific user or a group, that program is added to the set of available applications. The same drag-and-drop functions work with assigning printers. We rate menuing good.

Security: LAN Escort has numerous security functions. One option prevents a user from permanently modifying the Windows environment. That way an inexperienced Windows user can't destroy the workstation's entire setup by deleting a file or two. It also means that users will see the same desktop each time they start Windows.

Other options in the user dialog box allow the administrator to modify standard NetWare parameters, such as password required, expiration date, and log-in hours, using buttons and radio boxes. Other administration features allow you to assign a user to a specific group, configure available printers, allocate disk space, and determine access to specific network drives.

LAN Escort also provides the ability to set file or directory permissions for each program you create. Another dialog box enables you to grant or remove any NetWare right to a single file or entire directory. We rate security good.

DOCUMENTATION:
The LAN Escort documentation is well organized and complemented with helpful screen shots. It offers a complete discussion of the basics and the not-so-basics, complete with a table of contents and a comprehensive index. The first chapter even includes instructions for loading Windows on the network server so you don't have to consult your Windows manual.

A road map at the beginning of the manual directs both new and experienced administrators to the appropriate sections for their level of expertise. Several chapters discuss the basics involved in running Windows on a network. An appendix goes into great detail to explain how LAN Escort interfaces with NetWare 3.11 and Windows 3.1.

One security option prevents a user from permanently modifying the Windows environment.

We rate documentation very good.

INSTALLATION AND SETUP:
The first task you need to accomplish prior to installing LAN Escort is to load Windows on the network server using the SETUP/N method. The /N option loads all the files from the distribution disks, not just the ones for a specific computer, so any workstation on the network can access a complete list of drivers and other files needed to run Windows.

After loading Windows on the server, LAN Escort accomplishes all of the user setup for you, including copying the appropriate files to each user's home directory. Version 2.0 of LAN Escort comes on a single 3½-inch floppy disk, and the installation procedure requires very little human intervention. The installation function copies a batch file into the NetWare SYS:PUBLIC directory so you can start Windows from any directory.

Once you have loaded the program, you will need to configure users with the network administration program. The Homedirs program sets up existing NetWare users with the appropriate files and log-in commands. Setup and installation earn a score of good.

EASE OF USE:
By using standard Windows functions such as buttons, icons, and the drag-and-drop feature, a network administrator can use LAN Escort to configure large numbers of users in a very short period of time. The use of standard default desktops means that providing a consistent interface to an entire group of users is a simple mouse click away.

By providing a batch file loaded into the SYS:PUBLIC NetWare directory, every user starts up Windows the same way every time no matter what workstation they log in from. Ease of use earns a

REPORT CARD — INFO WORLD

LAN UTILITY SOFTWARE

LAN Escort

VERSION 2.0

Criteria	(Weighting)	Score
Performance		
Menuing	(225)	Good
Security	(150)	Good
Documentation	(75)	Very Good
Installation, setup	(100)	Good
Ease of use	(175)	Very Good
Support		
Support policies	(75)	Good
Technical support	(100)	Satisfactory
Value	(100)	Good
Final score		**6.4**

PRODUCT SUMMARY

Company: LANovation, in Minneapolis, is at (800) 747-4487; fax: (612) 378-3818.
List price: 50-user license, $995; 100 users or more $1,595.
Requires: NetWare 3.11, Windows 3.1.
Pros: Superior Windows setup administration.
Cons: Limited reporting capability.
Summary: LAN Escort is a quality product that eases Windows client administration.

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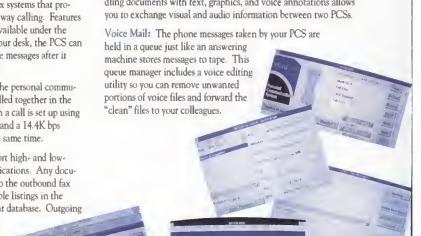

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score of very good.

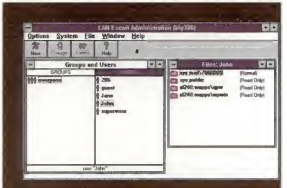
SUPPORT:
Support policies: LANovation provides free (but not toll-free) unlimited technical support weekdays from 8 a.m. to 5 p.m. Central time. LANovation offers a unique service that gets you started right with LAN Escort. A LANovation technical support person will set up a time to call you and walk you through the initial stages of configuring the program. The technician also asks questions to make sure you have accomplished all the prerequisites prior to installing LAN Escort. There is a 30-day money-back guarantee. Support policies are good.

Technical support: We had no problems getting connected immediately to a technical support representative, and we found the technicians to be helpful and very familiar with the program. If you manage to stump the first line of troops, they will take your name and have someone else call you back with an answer. We rate technical support satisfactory.

VALUE:
LANovation prices LAN Escort in two ways: a 50-user version for $995 and a 100- or 250-user version for $1,595. Automated Design Systems Inc.'s Windows Workstation (reviewed June 22, 1992, page 131) carries a 10-user price tag of $995 and a 100-user cost of $2,495, but it includes software metering. (LAN Escort does not.)

LAN Escort 2.0 offers unique desktop and application configuration options, and it does offer a simple reporting capability, but it could use some work to make it more flexible.

Even though the product has a few limitations when compared to similar products, it accomplishes the task of administering networked Windows users quite well. We rate value good.



LAN Escort enables you to assign a user to a specific group and determine access to different drive subdirectories.

InfoWorld guide to reviews

REVIEW SCORING

InfoWorld reviews only finished, production versions of products, never beta-test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.
Very Good = 0.75 — Meets all essential criteria and offers significant advantages.
Good = 0.625 — Meets essential criteria and includes some special features.
Satisfactory = 0.5 — Meets essential criteria.
Poor = 0.25 — Falls short in essential areas.
Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to *InfoWorld* readers involved in purchasing and using that product category.

You can customize the report card to your company's needs by using your own weightings to calculate the final score.

INDEXES

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The editorial review board selects products for review for each cycle. If your product is selected, you will be contacted to arrange shipment of the product for review. We request two copies of software; we return hardware, but not software, after review.

Because of the volume of submissions, we regret we are unable to contact vendors regarding products not selected for review.

FOR THE THIRD YEAR IN A ROW, LAN TIMES READERS CHOSE COMPAQ SERVERS OVER EVERY OTHER BRAND.

DesignCAD update has better speed, bigger command set

Now competes with fastest low-end CAD packages, but it requires more power, RAM

BY CAROLINE HALLIDAY REVIEW BOARD

American Small Business Computers Inc.'s DesignCAD 2D, Version 6.0 improves on the program's already extensive command set in this new, faster release. More than 50 minor commands have been added or enhanced, and there are a few other noteworthy improvements.

But there is a price. American has raised the previously minimal system requirements to at least an 80286 and 1MB of extended or expanded memory.

The welcome additions include commands such as Last Move-Copy, which repeats the last move or copy command. Others, such as Show Info, which displays DesignCAD's version and serial number, are not worth the upgrade.

The new features work, but the less-than-intuitive command names continue to be one of the product's weak points. Don't let go of the essential quick-reference card.

We tested DesignCAD 2D 6.0 with criteria from our May 28, 1990, (page 51) product comparison of low-end CAD packages. Our test bed was a 25-MHz 80386-based system equipped with an 80387 math coprocessor, 4MB of RAM, and a 120MB hard disk. Our printer was a Hewlett-Packard LaserJet Series II.

REPORT CARD — INFO WORLD

LOW-END CAD SOFTWARE

DesignCAD 2D

VERSION 6.0

Criteria	(Weighting)	Score
Performance		
Drawing tools	(75)	Very Good
Editing tools	(75)	Good
Placement tools	(50)	Good
Programmability	(50)	Excellent
I/O capabilities	(50)	Good
Processing speed	(50)	Very Good
Documentation	(75)	Satisfactory
Ease of learning	(125)	Satisfactory
Ease of use	(150)	Good
Error handling	(75)	Good
Support		
Support policies	(50)	Very Good
Technical support	(50)	Satisfactory
Value	(125)	Very Good
Final score		**6.5**

PRODUCT SUMMARY

Company: American Small Business Computers Inc., in Pryor, Okla., can be reached at (918) 825-7555.
List price: $349.
Requires: Intel 80286 or compatible; 640KB and 1.5MB expanded or extended memory specification; MS-DOS 3.0 or later; hard disk drive; graphics adapter card and monitor; math coprocessor, mouse, and digitizer are supported but not required.
Pros: Fast; many commands; strong device support and programmability.
Cons: Many poorly named commands; weak conversion utility; weak symbol handling.
Summary: As in previous versions, once DesignCAD's steep learning curve is overcome, it is a full-featured, valuable low-end 2D CAD program.

FEATURES:

This version offers dramatic performance upgrades that help it compete with the fastest low-end CAD programs.

Aside from the speed improvements, the best enhancements are the new select commands, which provide additional ways to select groups of entities. For example, you are no longer limited to selecting entities enclosed in a rectangular window. You can also pick them individually with the pointing device, adding them to entities already chosen.

There are many new dimensioning commands, as well. You can dimension chamfers and diameters, and you have more flexibility in changing dimension styles: You can add tolerancing, change terminator type, alter precision, and add suffixes and prefixes to the dimension text.

Some of the other additions may seem rather trivial but help complete the command set. For example, you can turn layers on and off; add a ballooned item to a drawing, with text in a circle; draw a circle through three points; set the path for DesignCAD drawing files; and shell out to DOS.

The new version improves on several previously weak points but retains DesignCAD's quirkiness with its unusual command names and methods of handling symbols.

PERFORMANCE:

Drawing tools: The major change to the drawing tools in Version 6.0 is the addition of new dimensioning tools. You can now dimension arcs, diameters, and chamfers, and you have access to additional styles of radius dimensioning. Previous versions included baseline dimensioning; 6.0 adds progressive dimensioning where the baseline measurements are listed in a single chain rather than as a series of stacked numbers.

The new version includes separate Horizontal and Vertical Dimension commands, whereas in past versions the Dimension command was used to do both, depending on the position of the text chosen.

New dimension options give you the ability to change terminator types, add prefixes or suffixes to dimension text, and change the dimension's precision. You can also measure the distance between two points.

Other detailing tools include a Balloon command that places a balloon of text on your drawing, and a Pullout command that places a pullout note on your drawing. You can use jagged extension lines with both balloons and pullouts, and there is a new Bezier Curve command.

The way DesignCAD handles symbol definition has become more peculiar in this version, but the changes, in theory, reduce the potential size of your files. In previous versions, a symbol was a separate drawing. When you placed a symbol within a drawing, the master drawing file increased in size for every entity within the added symbol drawing. You could also manipulate the symbol as a single group, but the file size increased with each symbol. Drawings containing complex symbols or a large number of symbols became very large very rapidly.

Version 6.0 adds a Symbol Load command. When you retrieve a symbol with this command, your DesignCAD 2D drawing increases in size by a single entity. Each symbol you place adds only a single entity to the file size and references the external symbol file. This system means you must preserve all the symbol drawing files along with the main drawings.

Once you have placed the symbols, however, manipulating them is tricky because the symbol is surrounded by an invisible rectangular defining box. To select the symbol, you must point to the edge of this rectangle. Once you have selected it, the rectangle is visible and manipulation is easy. Technical support suggests you use the Drag command, which allows you to select the symbol by picking anywhere on it. You can then abort that command and reselect the symbol once you have learned where its boundary is.

If you like, you can continue to use the old method of groups. Selecting a group involves picking a point on any of the entities in the group.

Drawing file sizes are further reduced by the new binary file format, although you may still use the original ASCII format.

The new Repeat command lets you create linear or rectangular arrays. This supplements the previous copying and circular copying commands. However, Copy Circle still requires you to rotate an object as you copy it. If you are copying chairs around a round conference table, for example, they will all face in toward the table. You cannot keep them all pointed toward a chalkboard at the end of the room.

Hatching is improved in this version. Previously, all hatched areas had to be surrounded by lines. Now, Hatch Fill will hatch enclosed regions including regions with multiple boundaries, such as a plate with holes in it.

These improvements are significant, but competing low-end CAD products have also improved their command sets. Consequently, we continue to rate DesignCAD 2D's drawing tools very good.

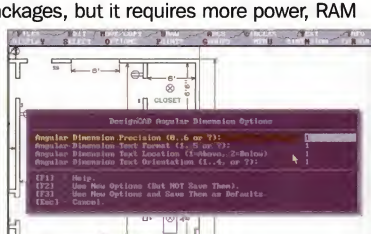
Editing tools: The Layer Enable and Disable commands are a welcome addition to DesignCAD. These alter the visibility of a layer. Version 6.0 supports 256 layers and 256 colors.

The Last Move-Copy command repeats the last move or copy you have executed. DesignCAD also provides an Unerase command for restoring deleted objects.

The powerful new select commands give you more flexibility when you choose entities to manipulate. The Select Mode command switches between Enclose and Touch modes. These are equivalent to AutoCAD's "window" and "crossing" windows. In Enclose mode, when you draw a selection window by picking two points to define a rectangular area, all entities fully enclosed within the window are chosen. In Touch mode all entities fully or partially enclosed in (touching) the window are chosen.

Other select commands include choosing all entities in a drawing, on a layer, or of a particular type. Once you have selected entities, you can save them to disk, scale them, or rotate them, as well as manipulate them as you could in previous versions using commands such as Copy, Move, or Mirror.

DesignCAD's main problem is in its command naming conventions. Unfortunately, as more commands are added the naming problems are compounded, particularly in the editing tools. For example, the new Select Scale command will change entities' scale in either the x direction, the y direction, or both. In contrast, the new Select Move command, which you might think was a display changing command, actually changes en-



Added dimensioning options in DesignCAD 2D, Version 6.0 give you far more control over the appearance of dimensions on your drawings.

tities' scale without changing their form factor; you supply a zoom factor that makes the selected objects larger or smaller.

You can use the added Fillet-2 and Chamfer-2 commands to fillet and chamfer while preserving the original corner. (However, we do not know why this is worth doing, and technical support did not have a suggestion.) Trim Double will trim two sets of parallel lines (equivalent to cleaning up the intersection of two crossing walls).

We raise DesignCAD's score for editing tools to good.

Placement tools: Few placement tools are changed in this version. DesignCAD continues to offer great flexibility with its multiple viewport features and its keyboard shortcuts for entering values.

This version adds options that permit you to set a snap grid size that is different from the display grid size. Other options allow you to enter mathematical or geographical angles and alter the format of the status line display. You can save these options and all the parameters with the drawing.

The Parallel-2 command will place a parallel line a specified distance from another line. As with the Parallel-1 command, you can also apply this to arcs, circles, and curves.

We continue to rate placement tools good.

Programmability: DesignCAD's BasicCAD programming language adds two commands, **Loadexe** and **Callexe**, to load or call an executable file (.COM or .EXE). Previously, you could load or call only .COM files.

DesignCAD continues to support such programmable features as recording keystroke macros and assigning them to function keys. Reprogramming the menus so the commands are arranged differently is also extremely easy.

Additionally, you can create your own icon menu so commands are shown onscreen in a crude version of the toolbox palette found in many other CAD programs. This version gives you the ability

DesignCAD 2D protects your work, but it is not always explicit with its error messages.

to change one of the icons in a menu and save it without having to reconstruct the menu from scratch.

DesignCAD encourages you, even as a non-programmer, to tailor your configuration. We continue to rate programmability excellent.

Input and output capabilities: DesignCAD now saves its drawings as binary files, rather than using the previous ASCII text format. This dramatically reduces drawing file size, an important consideration because of DesignCAD's continuing tendency to generate relatively large drawing files.

When we look at input and output capabilities, we see some very strong points and some very weak points. In its favor, DesignCAD continues to support a wide range of peripherals, in particular the lower cost devices, such as dot-matrix printers. You can print a large drawing on several pages and assemble them later, a feature that is essential for low-end CAD. And you can choose from several levels of output quality.

File translation is frustrating even with good translators, and DesignCAD's is not good. The file exchange utility that comes with the program purports to convert among DXF, IGES, GEM, PostScript, Renderman, and DesignCAD 3D formats. However, we continued to experience problems when experimenting. When we reviewed Version 5.0 (see July 29, 1991, page 69), we could not use IGES format to convert our AutoCAD nozzle drawing; this time we had to use IGES, because the DXF translation failed.

Since file translation is not important for all users, the good points outweigh the bad. We continue to rate input and output good.

Processing speed: DesignCAD is now able to use extended or expanded memory and requires at least a 286 microprocessor and 1½MB of extended or expanded memory. As a result, the new version of DesignCAD is faster.

DesignCAD 6.0's performance has improved significantly. It took only 31 seconds to redraw our test drawing, rather than the 47 seconds it took with Version 5.0. (Our test drawing consists of 16 copies of AutoCAD's sample nozzle drawing.) However, this is still slower than Generic CADD. We raise the score to very good.

DOCUMENTATION:
The documentation has been updated to include the Version 6.0 commands, but otherwise it remains unchanged. You get an installation and tutorial manual, a BasicCAD reference manual, and a general reference manual. The vital quick-reference sheet is still there, but we were disappointed to see that it is no longer printed on heavy stock paper. The digitizer template also remains part of the package.

You can get a list of DesignCAD 2D commands or help on a particular command from within the program. However, it is not as easy as it might be to get to the help. For example, you cannot get help on a command by selecting it from the help command list — you must issue the help command along with the command name to get a brief description of the command and how to use it. The descriptions are similar to those in the reference manual.

Although the manuals offer a description of each command and include a basic tutorial, the documentation lacks structure, conceptual information, and cross-referencing. We continue to rate documentation satisfactory.

EASE OF LEARNING:
Ease of learning remains unchanged for the most part in this version. However,

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American has improved its default screen menu names. For example, It has changed Parameters to Options and added a Select menu. DesignCAD's menus can very easily be customized to suit your own preferences.

Installation is easy, but the users' guide does not instruct you to install the extensive symbol libraries supplied with the program. These instructions are buried in the reference manual. Configuration both before and after installation remains elementary.

Command names remain unintuitive in DesignCAD — the new command names are more descriptive, but they are still strange. For example, the five basic arc commands are named Arc-1 through Arc-5. Arc-5, for instance, draws an arc with a beginning point and end point, and with a specified radius. Circle Tangent draws a circle tangent to two lines, but Circle Copy copies selected entities in a circle.

The documentation lacks an adequate tutorial and does not include introductory material. You still have to erase the current drawing from the screen to prevent a new drawing from being loaded into the drawing already on-screen. We continue to score ease of learning satisfactory.

Ease of Use:

Version 6.0 includes only minor changes to the user interface. Each pull-down screen menu now has a highlighted letter and can be accessed by pressing Alt and the letter. For example, you pull down the Files menu by pressing Alt-F and then choose Save from this menu by pressing S. This is only a small modification, but people who use multiple programs will appreciate this familiar way to use the menus.

Although some may find it overwhelming to learn, DesignCAD has a very rich feature set that can compete with some high-end programs. Provided you don't let go of the quick reference list (or if you have a photographic memory), DesignCAD is reasonably easy to use. We continue to rate ease of use good.

Error Handling:

Error handling is unchanged in this version of DesignCAD. The Esc key operation is idiosyncratic. It acts as a cancel command in some situations; in others it reverses the previous action.

Overall, DesignCAD protects your work, but the program is not always explicit with its error messages. The beeps, for example, can be confusing. By default, DesignCAD makes one sound when you make an error and a different sound when you press Esc. It also sounds the Esc beep when you move the cursor on and off the screen menus.

Although you can easily place an additional drawing on top of your existing drawing by accident, you cannot clear the drawing without being prompted to save your current drawing. Other error messages are less descriptive and are frequently DOS error messages that DesignCAD passes on to you. You would have to overlook the prompts to make a mistake you cannot rectify. We continue to rate error handling good.

Support:

Support policies: American Small Business Computers sells DesignCAD both directly and through dealers. It offers unlimited free support over a toll line, fax, and a private electronic BBS. There's also a 60-day money-back guarantee. We rate support policies very good.

Technical support: We made two calls to technical support and were delighted to get much better support than last time. We chose to be put on hold the first time, but we reached a technician within 5 minutes. The technicians were knowledgeable and were very familiar with the new commands in Version 6.0. We raise the technical support score to satisfactory.

Value:

DesignCAD, Version 6.0 includes some new features and is much faster; at the same time, it increases the minimum system requirements.

The product has many drawing and editing features, supports a wide variety of computers and peripherals, and gives the user a great deal of flexibility to configure the program. The programmable features cater to both beginners and more expert programmers.

DesignCAD still does not support symbols in the typical CAD interpretation of the term, but as the cost of disk space falls, perhaps this is becoming less important.

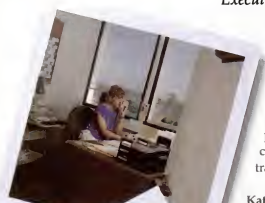
DesignCAD is not really suitable for production drawings, however, unless you completely master many of its commands.

The program has not changed in its overall value. At $349 it remains a very good value.

Caroline Halliday is an electrical engineer with High Tech Aid, a Pittsburgh-area firm specializing in technical documentation and training for the PC environment. Her latest book is the best-selling PC Secrets, *published by IDG Books Worldwide.*

IN FOCUS

KATY GURLEY
Executive Editor, News



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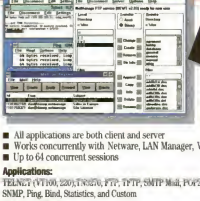

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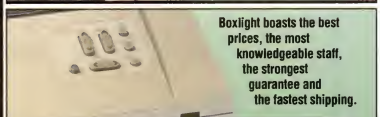

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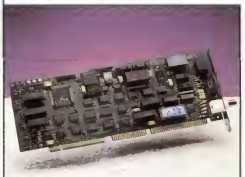

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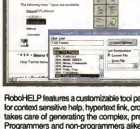

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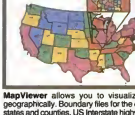

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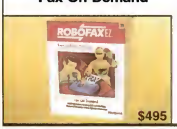

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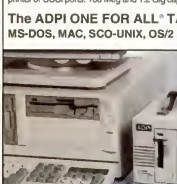

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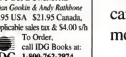

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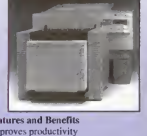

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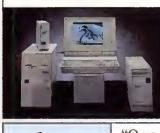

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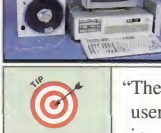

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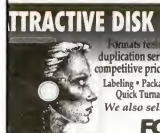

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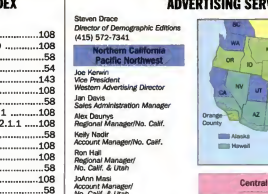

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UPCOMING IN INFOWORLD

MAY 31

PRODUCT COMPARISON

Network Interface Cards for Workstations. Following up on our April 19 comparison of network interface cards for servers, *InfoWorld* evaluates a batch of leading NICs designed for the client side of the network, all with 16-bit ISA-bus architecture for 10Base-T. Looking at products from SMC, Intel, 3Com, Eagle Technology, and others, we will assess speed, ease of administration and configuration, and overall value.

ENTERPRISE COMPUTING

Feature: Apple hopes to foster a new class of workgroup applications with its Open Collaboration Environment.

Case Study: A look at how one of the Indianapolis 500 race teams uses PCs and telemetry systems in their quest for glory.

JUNE 7

PRODUCT COMPARISON

Color LCD Projection Panels. As lightweight traveling companions, color LCD projection panels interface a portable PC to an overhead projector to put impressive presentations on a big screen. *InfoWorld* surveys the active matrix projection panels contending for market share, all with 640-by-480 or better resolution, including units from 3M, InFocus Systems, Apollo Audiovisual, Proxima, Sharp, and Telex. We will assess color fidelity and all-around display quality, measure color reproduction, and compare ease of setup and overall performance.

ENTERPRISE COMPUTING

Feature: Integrating Unix workstations and servers into the PC LAN environment. We take a real-world look at what you can and cannot do to provide end-users with application-level interoperability.

Management: How IS departments around the country are redefining mainstream computing with the integration of PC LAN and host systems. The goal of end-user information access requires not only systems interoperability but the cooperation of previously separate PC and host support staffs.

Case Study: Bank of America downsizes its customer service system to a client/server platform while maintaining connectivity with legacy systems.

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EAST WEST
EDUCATION DEVELOPMENT FOUNDATION

DEC to roll out NT-running Alpha PC

BY JAYNE WILSON

Ending months of anticipation, Digital Equipment Corp. will announce at Comdex this week its Alpha PC, one of the first PCs to run Microsoft Corp.'s Windows NT operating system.

A general ship date and exact pricing will be given at the announcement, DEC officials said. Analysts estimate the machine will be priced between $4,000 and $7,000.

"This product reaches a PC-class price point with a high degree of power," said Jesse Parker, DEC group product manager of the PC business unit. "It won't be $2,000. It is not designed to go down to the very-low-thousands price point."

The low price points will be the province of DEC's Intel-based machines, which remain the cornerstone of the company's PC offerings, Parker said.

Based on the 64-bit Alpha chip with a clock speed of 150 MHz, the AXP/150 is the fastest processor available today.

COMDEX

Positioned as a departmental server, the AXP/150 is geared to customers needing more power to drive networks and graphics capability. It is for people using CAD/CAM applications, floating-point sensitive work, and compression and decompression of video images. The Alpha PC also is aimed at independent software vendors porting applications to Windows NT 32-bit code.

The AXP/150 is housed in the tower enclosure used in DEC's ST server family. It is a six-slot, EISA-based machine with 16MB of memory, expandable to 128MB. Performance ratings for the AXP/150 are 104 integer SPECmarks and 180 floating-point SPECmarks.

"I see the [AXP/150] machine competing directly with Pentium-based PCs from other vendors — for example, Tricord and NetFrame superservers," said Randal Guisto, senior analyst at Workgroup Technologies, in Hampton, N.H.

The DEC PC AXP/150 will be available through DEC's direct-mail catalog, (800) PC-BY-DEC, and the direct sales force.

New to you at Comdex

A few of the hardware companies debuting products at Comdex are:

- **NEC Technologies** — 2 Pentium-based Image series desktops
- **Hewlett-Packard** — Desktop Pentium-based system
- **Media Vision** — MPC II multimedia upgrade kits
- **Toshiba** — Satellite 1900, 1900C notebooks
- **Star Micronics** — SJ-144, a 360-dpi printer
- **Cyrix** — Cx486S line, a 486SX pin-compatible series of processors
- **Matrox** — MGA, a 64-bit graphics chip
- **ATI** — VGAWonder GT, a graphics accelerator card

Jot cross-platform standard puts scribbles on desktops

BY YVONNE LEE

Corporate users will soon be able to store handwritten information across platforms.

Thanks to a jointly developed specification from major software developers, users will be able to create handwritten information on any major pen-based operating system and store it on desktop and corporate systems.

The specification developers are Slate Corp., Apple Computer Inc., General Magic, Go Corp., Lotus Development Corp., and Microsoft Corp.

Right now, users can pass text-based information from a pen computer to other systems and can send graphics files as bit-mapped images. But things like signatures lose something in the translation.

The specification, Jot, can be used for applications such as signature verification because it stores the image and information about how the image was created.

By storing more than the image itself, Jot will let applications input handwritten information into recognizers for deferred translation, resize and display the information at various resolutions, and use the information in handwriting-recognition programs.

Jot stores data about the pen tip used, ink color, digitizer sampling rate, and pen angles.

The hazardous waste department at at Lawrence Livermore National Laboratory, in Livermore, Calif., is one site that has searched for ways to both store and verify signatures on the desktop. Jim Ryeck, principal engineer for the project, has tried storing signatures as TIFF images using Aldus SuperPaint and pasting them into the Informs data entry form.

Slate will immediately support Jot in PenApps. Microsoft will support Jot in the next releases of Windows and Windows for Pen Computing.

Corporate developers can receive a copy of Jot from the Software Developers Association at (202) 452-1600, Ext. 336.

APPLE / from page 1

Apple takes both high and low roads

monochrome system, with a 33-MHz 68030 processor, 4MB of RAM, an 80MB hard drive, and a video-out port. Battery life is estimated at about 2 hours.

At the low end, Apple will replace the 145 with a slightly scaled-down version sporting a passive matrix screen, 25-MHz 68030 processor, 4MB of RAM, and an 80MB hard drive.

The 145 will be part of Apple's retail Performa line, sources said.

Other Apple products remain difficult to get months after introduction. However, Apple has promised that large numbers of the new systems will be available at introduction.

Unlike the PowerBook 180, which is on back order for many customers because it uses a unique active matrix monochrome display, Apple is getting its color screens from multiple sources.

"We want to make sure that we can meet the demand for this product right from the start," said Fred Forsyth, Apple's senior vice president and general manager of engineering.

OVERDRIVE / from page 1

Intel goes into OverDrive on problems

includes a custom heat sink and miniature fan.

Some systems have add-in boards situated directly over the upgrade socket, making that solution unusable.

Even manufacturers who swear they followed Intel's instructions to the letter are worried they won't be able to protect customers' investments.

"We still don't have any real chips from Intel to test," said an executive with one large manufacturer. "All Intel has given us is thermal samples."

Intel, however, insists that for virtually every customer who purchased a 486 with a Pentium upgrade socket, some upgrade chip will be made available.

"When we tested systems to make sure they met our [upgrade] specifications, we saw that a lot of them didn't work," said Dennis Carter, Intel vice president of marketing. "So we decided to loosen the specifications so those sockets could run a Pentium upgrade processor."

Intel won't specify what steps it will take to ensure that buyers get a usable OverDrive processor, but it plans to release a series of the chips designed for various systems, said sources familiar with Intel's plans.

For some systems that would mean just a standard 238-pin chip. For other systems, Intel plans to add its own beat sink and fan to the processor. Intel has also designed a 237-pin upgrade socket for future systems.

— Steve Polilli contributed to this article.

HP finds bad page sensors, pulls LaserJet 4L from stores

BY KELLEY DAMORE

For the second time in two months, Hewlett-Packard Co. has had to withdraw a printer from the market after routine ongoing testing found a serious problem.

Last week HP confirmed that the LaserJet 4L, announced earlier this month, was taken off dealer shelves when the company found that the paper sensor in the 4-page-per-minute (ppm) laser printer was not working properly. The sensor indicated that the input tray was out of paper when there was paper in the tray.

Due to this problem, shipments of the printer may be delayed to dealers for up to a month, HP officials said.

"We have incorporated a fix into our manufacturing procedure," said Jim Broich, a company representative. "We are still shipping the product, but not in the numbers that we would like."

Last month HP recalled the LaserJet 4Si, its 17-ppm network printer, because of a faulty scanning mechanism. (See "HP replaces some LaserJet parts," April 12, page 3.)

Although some question whether HP is slipping in quality control, analysts contend the two problems are coincidental. "Hewlett-Packard has an extensive testing process, and at least they are catching the problems before the printers are shipped to a large number of users," said Marco Boer, senior analyst for International Data Corp., in Framingham, Mass.

"Users usually do not encounter problems with HP printers. Everyone assumes that HP is invincible," Boer said.

NETWARE / from page 1

Novell readies enhancements to NetWare

day to roll out NetWare 4.0 in production environments," the report said. Jamie Lewis, Burton Group president, said users who need to deploy directory services immediately should also look at Banyan Vines.

The Burton Group, headed by Novell cofounder Craig Burton, is considered a leading authority on NetWare. The report criticized NetWare 4.0 for poor directory change management.

"If a company tries to integrate existing departments that already have 4.0, the only alternative is to wipe out those trees and start over," the report said.

Novell's Young said change management utilities are under development and will allow users to merge individual directory trees or elements of them.

Young also said the directory search capabilities — which the Burton Report called weak — will be enhanced to allow managers to conduct wild-card searches and to search more than one attribute from any point within the directory.

To ease administration of mixed NetWare environments, Novell will also improve synchronization between NetWare Directory Services and hierarchy emulations of NetWare 2.x and 3.x servers. The enhancements are in final testing at Novell's lab in Provo, Utah, Young said.

Novell has not determined whether the improvements to NetWare 4.0 will be add-on utilities or delivered with NetWare 4.x's next release.

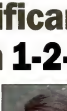
Young confirmed more than 50,000 copies of NetWare 4.0 have sold.

"I wouldn't be surprised if most are still shrink-wrapped," Lewis said, adding that many users have not yet installed it.

REVIEWS / TEST DRIVES

First Look / Kevin Strehlo

Lotus significantly improves usability in 1-2-3, Release 4



In our first Windows spreadsheet comparison (see October 12, 1992, page 104), we couldn't recommend Lotus Development Corp.'s 1-2-3 for Windows.

That's no longer the case. When Lotus 1-2-3, Release 4 ships in June, its vastly improved usability will make it a reasonable choice for stand-alone use. More importantly, its version management features give this Lotus entry an edge over Borland International Inc.'s Quattro Pro and Microsoft Corp.'s Excel for collaborative budgeting and forecasting.

REAL FINANCIAL GROUPWARE. In essence, Release 4's Version Manager lets you manage even a complicated matrix of what-if assumptions contributed by a variety of users. Variations on sales for a given product line, for example, are identified with a version name, contributing user's name, date, and comment.

You can then construct various scenarios by combining those assumptions. For example, a scenario depicting the worst-case expense figures combined with the best-case sales figures from every product manager might be labeled "high sales, high costs."

You will have to be on the lookout for cases in which two sets of assumptions overlap. In such a case, the second assumption applied to the scenario takes precedence over the assumption applied first. Although 1-2-3, Release 4 shows graphically that the scenario is "dirty" — in other words, that cell values in one set of assumptions have overwritten cell values in another — you are responsible for finding the numbers that disagree and reconciling the differences.

Version Manager is a powerful tool for making the contributions of a group greater than the sum of its parts. Before its advent, the difficulty of managing many users' assumptions often resulted in models that were *less* than the sum of their inputs. If users were geographically dispersed, it was unlikely an attempt to combine their many assumptions would even be made.

But with Release 4 spreadsheets embedded in a Lotus Notes database, you can automatically replicate changes in assumptions to everyone.

If you add an associated Notes discussion database to facilitate understanding of all the various scenarios, you will have the ultimate tool for getting the most out of a geographically dispersed group.

Just be aware that Release 4's power and flexibility is also a temptation. As long as you exercise restraint and avoid running through all possible permutations, you will find Version Manager invaluable.

IMPROVED USABILITY. Where previous versions of Lotus 1-2-3 for Windows lacked shortcuts and were encumbered by poorly structured menus and dialogs, 1-2-3, Release 4 provides many shortcuts in an elegant interface.

For example, earlier versions of 1-2-3 left you in the dark about text and graphic attributes. Release 4 borrows the ingenious status bar from Ami Pro, which not only displays font, size, format, and active SmartIcon set but also lets you change those attributes with a click on the status bar and a choice from a selection box.

The menus and SmartIcons in this version change according to context. Thus, 1-2-3 switches from a range menu and range-specific SmartIcons to a chart menu and chart-specific SmartIcons as you move from selecting the numbers you want to graph to tweaking the graph itself.

Release 4 also lets you organize several related sheets in the same file and choose which one you would like to work on by selecting a tab, just as you might organize a report in a notebook. This was an advance first offered by Borland's Quattro Pro for Windows.

Also borrowed from Quattro Pro is the capability to select an item and click the right mouse button to get a comprehensive menu of actions you can perform on that item.

In Release 4, Lotus has also greatly improved the ease of learning Lotus 1-2-3. Until you learn a particular icon's meaning hieroglyphically, you can click on it with the right mouse button to display a text explanation. You can also get help in the form of a targeted hands-on tutorial any time you want to learn and apply an unfamiliar function or feature.

COMPETITIVE GRAPHING. Lotus 1-2-3 used to force users to create graphs in a separate window, offered no more than eight colors at a time, and made resizing and moving the resulting graphs quite difficult. Release 4 lets you create color graphs with a full-color palette right on your spreadsheet.

Rearranging the position and size of the whole graph or any of its elements (legend, headline, bars, etc.) is as simple as selecting, dragging, and clicking the right mouse button to get a menu. You can even enhance your spreadsheets and graphs with Release 4's drawing tools.

If you are aesthetically handicapped, as I am, you may prefer to review one of the preconstructed styles from Lotus 1-2-3's gallery. This will automatically apply a pleasing combination of fonts, type sizes, fills, and colors to a block of numbers.

ATTENTION TO DETAIL. There are many more small improvements that bring Lotus 1-2-3, Release 4's usability into a virtual dead heat with the competition.

1-2-3, Release 4 lets you edit in place — in the actual cell rather than in an edit box at the top of the screen. You can select a block of numbers plus one row and column, click on the SmartSum icon, and 1-2-3 enters formulas to add the columns and rows both down and across.

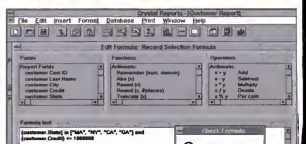
A double-click automatically sizes a column to fit the widest entry in the column. If you give Release 4 an example element, it will fill out the rest of the series.

The improvements go on and on. Although 1-2-3, Release 4 is by no means the perfect spreadsheet, its strengths in collaborative planning make it well worth the $495 list price, particularly if your firm is interested in improving the productivity of groups as well as individuals.

Lotus, based in Cambridge, Mass., can be reached at (617) 577-8500.

Kevin Strehlo is InfoWorld's executive editor of reviews and testing. First Look examines new products before they have been through a formal review.

WINDOWS REPORT WRITER



Crystal Reports' Edit Formula dialog lets you create complex selection formulas that control which records appear in a report.

Crystal shows imagination in dealing with Xbase files

BY MAURICE FRANK
REVIEW BOARD

Crystal Reports 2.0, from Crystal Services Inc., is a report writer built from the ground up for Windows. It is one of three recent entries in the report writing arena competing to attract developers and end-users working with Xbase files in Windows. Last week we looked at R&R for Windows from Concentric Data Systems Inc. (See page 106.) Next week we will look at Computer Associates International Inc.'s CA-RET/Xbase.

All three products cover reporting basics, and each can prepare a wide variety of report formats. Crystal works with all Xbase, Btrieve, and Paradox 3.5 and 4.0 files.

Crystal has a good balance of end-user and developer

None of the packages can access functions in Dynamic Link Libraries (DLLs), although the reporting engine in Crystal is a DLL that can be called by other development products, such as ObjectVision.

Crystal has a good balance of end-user and developer features. It lets developers create run-time reports so end-users won't need the full product.

To create a report with Crystal, you select a database. Crystal then displays a dialog box with field names. Double-clicking a field places it in drag-and-drop mode. Placing a field on the body line also inserts the field name above it as a default column title.

Crystal does not include a quick report feature (as R&R does) that automatically lays out all or selected fields. The program also doesn't support Dynamic Data Exchange (DDE). As with CA-RET, however, Crystal can open multiple report windows.

The program's voluminous function list features many time savers, including functions that compute aging for standard periods, such as 30, 60, or 90 days.

With Crystal you can select records by choosing an option on the Properties menu, which pops up when you click the right mouse button over any field. You can define multiple conditions this way, or you can edit all the selection criteria using a dialog. Crystal can also prompt users for selection criteria values when a report executes. However, prompting for dates proved convoluted, because they must be converted to character data within formulas.

Crystal is smart enough to guess how files are related by checking for common field names and data types. You can explicitly define relationships if the program's best guess is wrong. As with R&R, Crystal can print documentation of a report's content and organization.

Crystal shows imagination, but like the other products in this series of Test Drives, it is not yet a must-have add-on.

Crystal Reports lists for $195.

Crystal Services, in Vancouver, British Columbia, Canada, is at (604) 681-3435.

newspaperarchive.com

NETWORKING SOFTWARE

MacLAN Connect provides close to flawless file sharing and print services

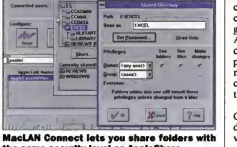
BY ANNE KALICZAK
ASSOCIATE REVIEWS EDITOR

Personal MacLAN Connect enables Windows and Macintosh users to transparently share files and print services. I looked at a beta version of Personal MacLAN Connect and was impressed by its relatively flawless operation and installation.

Personal MacLAN Connect's graphical user interface was self-explanatory. But there is clear, concise documentation and online help. Setting up users, groups, privileges, and shared folders was a snap — identical to setting up an AppleShare server. Print services were just as easy; you just select a printer on the network, and the program automatically creates a spool file. Performance on the PC wasn't significantly degraded with either the file services or print spoolers installed.

Personal MacLAN Connect supports file sharing and locking in most programs. However, there is one notable exception: Microsoft Word for Windows 2.0 and Microsoft Word 5.0 for the Macintosh. When I opened the same document on both machines, a "File In Use" message didn't appear because Word opens an untitled document on the Macintosh instead of the actual file.

In order to ease the transition between commonly used Mac and PC application files, Personal MacLAN Connect includes a detailed summary of file extensions on both platforms and maps the most commonly used PC file types to their Mac-compatible extension. This means that any Mac client can select and double-click on a PC file and launch the appropriate program. You can also add your own custom extensions.



MacLAN Connect lets you share folders with the same security level as AppleShare.

Before you install Personal MacLAN Connect, you need a network card, some cable, a PC running Windows 3.1 or later, and a Mac running System 6.0 or later. If you are already connected to a network (e.g., Novell Inc.'s NetWare 3.11, Banyan Systems Inc.'s Vines, Artisoft Corp.'s LANtastic, or Microsoft Corp.'s Windows for Workgroups), you can install Personal MacLAN Connect on top of your existing network without disrupting or interfering with your other services.

Overall, Personal MacLAN Connect is an extremely useful product for just about anyone who wants to share Mac and PC files on an existing network or set up a small peer-to-peer network of their own. It far surpasses the file transferring capabilities of Access PC or Dayna's DOS Mounter products at a very reasonable $199.

Miramar Systems, located in Santa Barbara, Calif., can be reached at (800) 8MACLAN or (805) 966-2432.

GRAPHICS SOFTWARE

Micrografx takes on CorelDraw

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

Following the example set by CorelDraw, an integrated package that includes vector drawing, photo editing, charting, and slide-show modules, Micrografx Inc. has released Graphics Works. As with CorelDraw, Graphics Works is composed of a vector drawing module, a photo editor, and slide-show and charting modules. In addition, Graphics Works includes Windows OrgChart, an application for creating organizational charts.

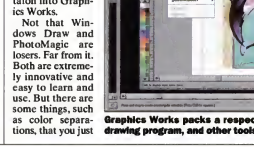
Despite the similarities, however, Graphics Works is aiming at a somewhat different market — those who want high value but don't need high-end tools.

Whereas Corel Systems Corp.'s integrated package is oriented around its top-flight vector CorelDraw drawing program, Micrografx has passed over its high-end drawing program, Designer, and instead used Graphics Works' centerpiece. Similarly, rather than include its flagship raster program, Picture Publisher, Micrografx put its lower end PhotoMagic application into Graphics Works.

Not that Windows Draw and PhotoMagic are losers. Far from it. Both are extremely innovative and easy to learn and use. But there are some things, such as color separations, that you just can't do with Graphics Works. Nor can you work in multiple layers, or do autotracing or other advanced tricks. In addition, Graphics Works' charting module is quite capable of creating attractive charts, but it lacks the variety of chart types and tools for controlling text that many users have come to expect.

What makes Graphic Works special is the price. CorelDraw 4 carries a $595 price tag, but Micrografx has priced Graphics Works at only $295. There is also a special $129.95 price for users of companion programs, such as presentation graphics packages and word processors. PhotoMagic and Windows Draw alone are well worth that price. In addition to the extras already mentioned, that $295 buys you 32 TrueType fonts and a clip-art and photo library with thousands of items.

Micrografx, in Richardson, Texas, is at (214) 234-1769, Ext. 5050; fax: (214) 994-6475.



Graphics Works packs a respectable image editor, vector drawing program, and other tools into a low-priced package.

WINDOWS SHELL

Norton Desktop 2.2's support for Microsoft Mail is a plus

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

Symantec Corp. is quick to point out that this is not a major new release of Norton Desktop for Windows. In fact, unless you use Microsoft Corp.'s Windows for Workgroups, you may not notice any differences at all between this release and the previous version.

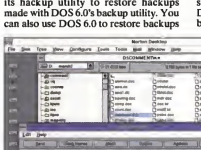
However, if you do use Windows for Workgroups, you'll be glad to see that NDW, Version 2.2 can now display and access files across shared drives. In addition, you can perform all the directory sharing and connecting that Windows for Workgroups depends on.

Even better, this new NDW directly supports Microsoft Mail, allowing you to drag and drop files directly from NDW's file manager onto the Mail icon to send a file as an attachment to someone else on the network.

You can also directly access Mail from five NDW utilities: Disk Doctor, System Information, AntiVirus, Editor, and BatchBuilder.

The new version of NDW also provides support in certain areas for MS-DOS 6.0.

For example, Symantec has enhanced its backup utility to restore backups made with DOS 6.0's backup utility. You can also use DOS 6.0 to restore backups made with Norton Desktop for Windows if you choose Microsoft's compression standard before backing up. Although DOS 6.0's backup utility is hardly the best in the business, that compatibility can be convenient when you are exchanging backed-up data with others or transferring files to other machines that may not have Norton Desktop for Windows installed.



NDW 2.2 integrates nicely with Microsoft Mail, letting you automatically attach files to E-mail messages.

At the same time, Symantec has expanded Norton Desktop for Windows' list of supported storage devices to include high-speed tape controllers made by Colorado Memory Systems Inc. and Iomega Corp.

What's more, if you're one of those brave souls who is actually using MS-DOS 6.0's DoubleSpace disk compression, Norton's data recovery tools will let you unerase files on those compressed drives as well as uncompressed ones.

Symantec has some quick footwork to do if it wants NDW to stay competitive with the recently released PC Tools for Windows. As expansive as NDW's features list is, it can't quite match that offered by Central Point Software's new program. (See PC Tools review, May 17, page 74.)

However, NDW's integration of Mail is a major plus for network users and may prove reason enough for Desktop fans to stick with the program until its next major release.

Desktop for Windows 2.2 lists for $179, but Symantec is offering a promotional price of $99 with the purchase of MS-DOS 6.0.

Symantec Corp., in Cupertino, Calif., can be reached at (800) 441-7234 or (408) 253-9600.

OS/2 evangelist Reiswig is ready for the OS battle

If this were Indianapolis, someone would say, "Gentlemen, start your engines." Instead, it's Atlanta, and Microsoft Corp. and IBM are lining up to pitch their 32-bit operating systems. For Lee Reiswig, president of IBM's personal software products group, this race has been long in coming. As evangelist for OS/2, Reiswig has been waiting for an opportunity like the one presented now — NT isn't ready yet. Fresh from having persuaded IBM's new CEO Louis Gerstner that OS/2 is worth IBM's continued attention, Reiswig is now focused on bringing the same message to computer buyers.

InfoWorld *Boston bureau chief Ed Scannell met with Reiswig to talk about the operating systems race following the announcement of OS/2 2.1 in New York last week.*

InfoWorld: Some people are saying this is the last gasp for OS/2. If you fail here, you will have to wait for the next battle — the Workplace OS. So [Gerstner] is fully committed to this thing, for the next 12 months anyway?

Reiswig: Well, I think he is committed. We are in this battle for the long haul. If we get knocked out, we get knocked out. But it is too soon to really say that Gerstner has an appreciation for all of IBM's businesses and their strategic importance. He has only been here 60 days, and we are a $60 billion company. He is not making business decisions. He wants to understand what the data processing industry does and what it is today and what it will be tomorrow and what role we will play in it. Then he'll put people in place to lead those businesses.

InfoWorld: The IBM PC Co. plans to bundle Windows NT, and IBM Toronto plans to move DB2 technology over to Windows NT. Are you worried that you are being undermined by your company?

Reiswig: I never thought, frankly, that I would get exclusive rights to IBM's hardware or software development. They have to do this to be a market-driven company. Actually, I think I get quite good treatment from IBM. There was an OS/2 communications manager before there was any other communications manager, and the PC Co. loaded OS/2 before it preloaded DOS and Windows. So, to some degree, I enjoy the benefits of the corporate relationship.

InfoWorld: AST's and Dell's support is nice, but don't you need a manufacturer that will preload OS/2?

Reiswig: Manufacturers will preload because they have customers that really want it. The preload business is a little dangerous. Shipping customers something they do not want, or something they did not think they bought, is not a good idea.

InfoWorld: Once your agreement with Microsoft ends on September 30, what kinds of problems do users and developers face in terms of making decisions about buying and supporting operating systems?

Reiswig: Over the long haul it will mean that enhancements to the operating systems won't be tracked as closely as they are now on either side. Microsoft is not committing to providing applications support for OS/2 under NT and can't do it on Windows. We have done extensive work on what it means to support 32-bit compatibility.

InfoWorld: Microsoft continues to play this game of roving application programming interfaces.

Reiswig: Right, and sometimes I can't follow that game, but we actually use the DOS kernel and system in OS/2. So having Microsoft's source code for Windows 16-bit was actually helpful to us because all we had to do was run it as an OS/2 virtual machine. We don't use the 32-bit kernel because we are not on NT. So we have our own 32-bit kernel and 32-bit graphics engine. For us, providing Windows applications compatibility at the 32-bit level means including a thin layer on top of the OS/2 surfaces that map the NT APIs to the OS/2 services. And that is a fairly straightforward thing to do.

InfoWorld: Are you thinking about supporting Win32s and Win32c?

Reiswig: We are exploring that. Of course there are no applications yet.

InfoWorld: Well why not just do it in order to eliminate the marketing game Microsoft could then play against you? And if your users want it, it would just be there?

Reiswig: In one sense it is easy to say that is the right thing to do. But that means I did not do something else. I mean we have limited resources. If we use people to do this, then we are not using them to do that. And believe me, the work is that intensive.

InfoWorld: What about mapping a Windows application programming interface right into your kernel?

Reiswig: Some of that we need to do. And OS/2, Version 2.2 would be the next time we could do that. That is under consideration.

ONE ON ONE

Lee Reiswig
President
Personal Software Products
IBM
Austin, Texas
Age: 43

Notes From the Field / Robert X. Cringely

It may not be soul food, but high-fiber 1-2-3 4.0 for DOS is still a gas

The more things change, the more they stay the same. Here we are in Atlanta — the yuppified, fiber-optic, built-on-junk-bonds-and-rolling-on Michelins headquarters of the New South — and what are we eating? Collard greens. Soul food.

"What is a collard, anyway?" I asked, dubious of the green mound before me.

"Collards are the ultimate green, the Evian of weeds," declared Pammy, mistress of vegetarianism, as she chowed down. "Eat. Your colon will thank you."

BACK TO BASICS. On further reflection, it seemed that my colon was yearning not for greens but for the slab of ribs that passed by on its way to feed a lawyer at the next table. This was in Thelma's, the best down-home restaurant in Atlanta.

Down home in the PC business means that old reliable, the DOS spreadsheet, which got us where we are today. Lotus has 1-2-3, Release 4 coming soon, bringing to DOS the look and feel of a Windows product.

On the other end of the development spectrum, it looks like Walden, the object-oriented Lotus spreadsheet, is not a product as much as a technology. Pieces of Walden will begin appearing

FRED MACH

soon in other Lotus products.

Pieces of entrepreneurial zeal are unlikely to appear soon at IBM. On a visit two weeks ago to PC HQ in Somers, N.Y., an old friend reported that they turn off the water in the bathrooms at 5 p.m. Now *that's* sure to encourage people to work late.

DO AS I SAY, NOT AS I DO. "Those ribs will give you heartburn."

"Heartburn is a badge of culinary courage; bring on the pork!"

Intel lately has been getting some heartburn from the hotter-than-expected Pentium chips. What does Intel give up by admitting that an extra fan or even one of those CPU cooler thingies is a good idea, especially since it has bought hundreds of these devices for its own PCs?

FIRST KILL ALL THE LAWYERS. We had dragged into Atlanta several days before Comdex, giving us time to enjoy a city not filled with computer guys. But with the whole town torn up to build the 1996 Olympics, there seemed to be no natives other than construction workers and, at least at Thelma's, lawyers.

"You mean the Games of the XXIVth Olympiad," said the intellectual property attorney at the next table, barbecue sauce dripping down his chin.

"Do I have to pay you money for saying that?" I asked.

Too much computer news lately is really legal news. The latest move in the Lotus-Borland lawsuit was Jim Manzi's offer to drop the action in exchange for Paradox for Windows. No deal.

More legal stuff: One of the best bits of computer design lately is the one-handed on-off Xircom pocket Ethernet adapters. A ribbed ruhher hand acts like an Abrams tank tread to turn bolt attaching screws at once. But the patented design doesn't belong to Xircom. It's owned by a small industrial design company in Illinois that is now locked in a legal embrace trying to get Xircom to pay up and stop licensing the design to companies like Madge Networks.

But it's more than just lawsuits that give us the willies. Some companies go so worried about making the wrong decisions that they can't take any decisions at all. Only a week ago at Sharp headquarters in Japan, they were still arguing about which of five competing Apple Newton prototypes to produce. One thing the personal digital assistant had in common, though, was built-in communications. There was talk that this would be left out of the first models but it won't be.

"Let's do our colons a favor, Pammy," I said, pushing away from the table. "Bushmills is very high in fiber, you know, for a whiskey."

Low in fat, too. Share the experience by calling me with an industry secret (415) 312-0555; fax: (415) 358-1269; MCI:CRINGE, or cringe@infoworld.com.